

# NATIONAL CAR-BUILDER

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NUMBER 2.

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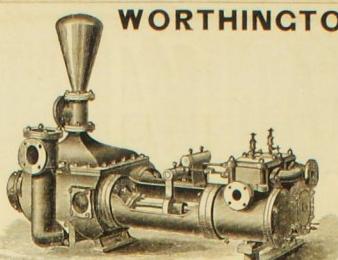
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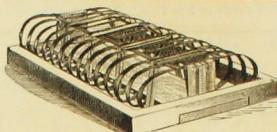
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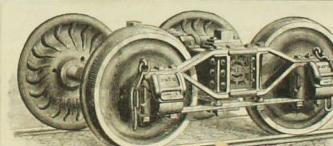
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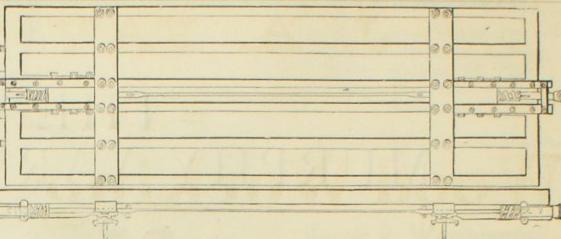
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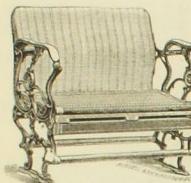
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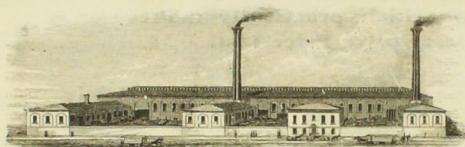
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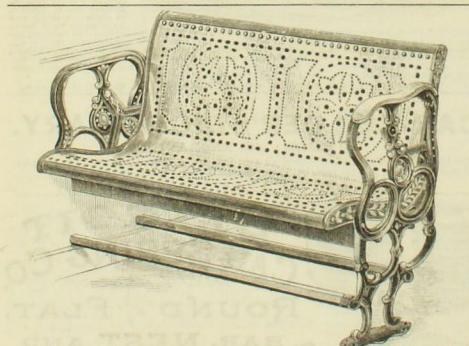
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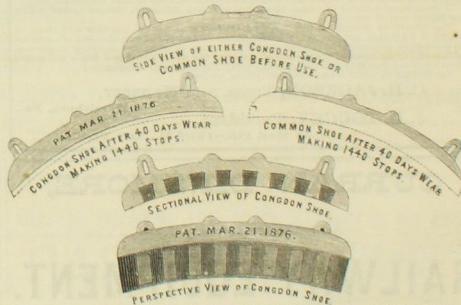
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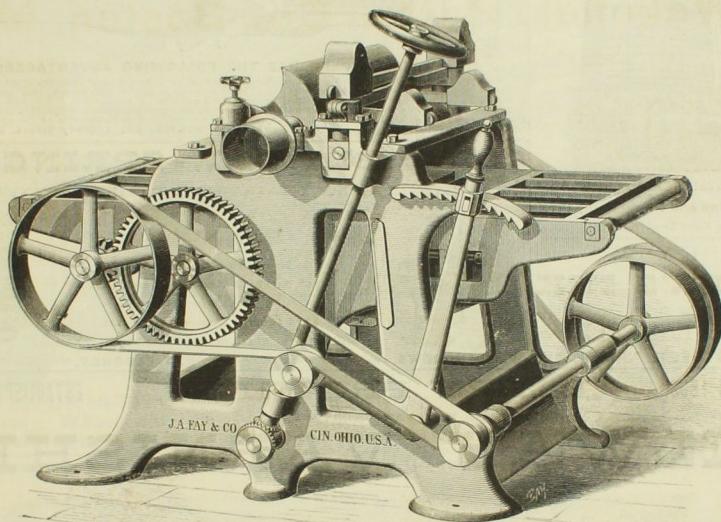
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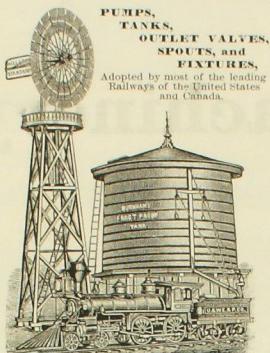
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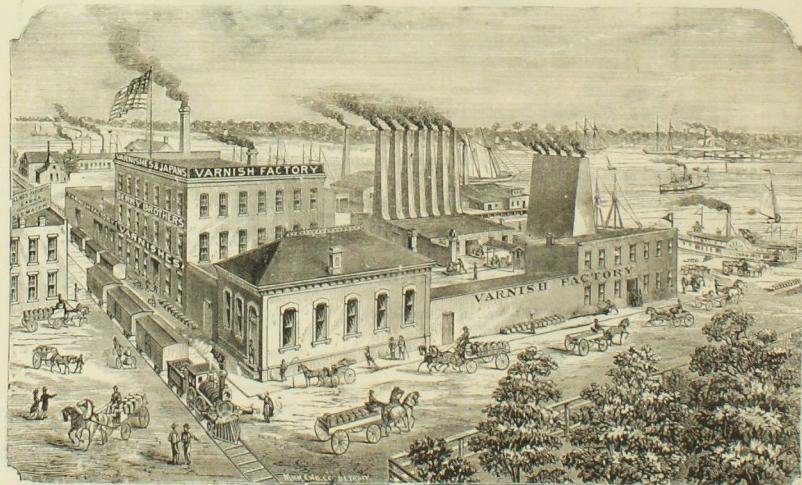
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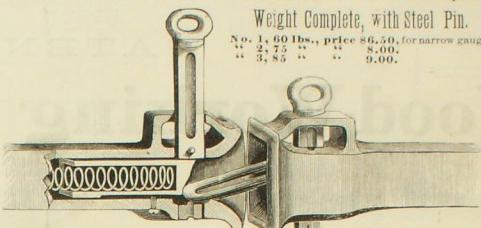
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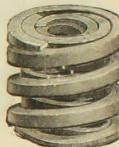
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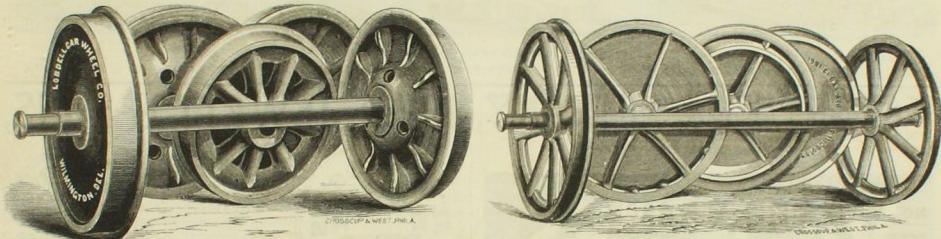


FEBRUARY, 1880.]

THE NATIONAL CAR-BUILDER.

v

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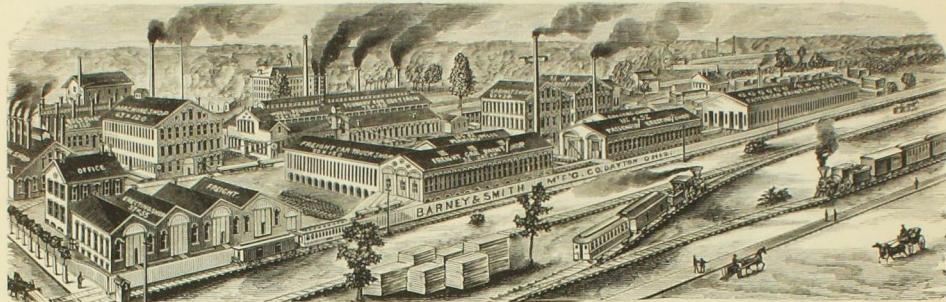
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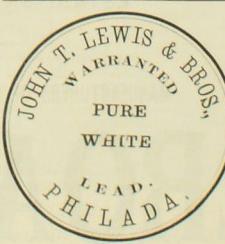
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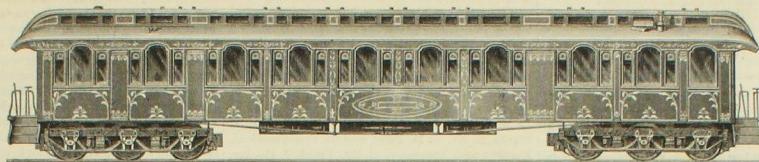
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# THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XI.  
NUMBER 2. 1

FEBRUARY, 1880.

(SINGLE NUMBERS, TEN CENTS.  
\$1.00 PER ANNUM.

## Miscellaneous Items.

THE Great Western Railway Company, of Canada, has erected a large and magnificent new depot, at Clifton, Ont., in place of one destroyed by fire last April. It is of brick, in semi-gothic style, with stone caps, sills and corners. The waiting rooms are finished in the most elegant manner, the floors are of oak and the walls of plaster of Paris, with high ornamental ceilings.

THE Chicago & Alton has four new postal cars equal to the best passenger coaches, and with several marked improvements for facilitating the mail service, prominent among which is a reversible nest of cases at the front end of the car, containing about 300 boxes, arranged in such a way as to give a large number of pigeon-holes in the smallest possible space. Student-lamps, with sockets fitting to any part of the case, are also provided. The cases for newspaper distribution are in four tiers of supports, with hooks for eight sacks, arranged on an elevated incline which adds much to the rapidity of this work. The process of "tying out a sack" is greatly improved in the new cars. Two rows of about forty boxes above the head of the distributing clerk are so arranged as to be emptied into the sacks by merely pulling a slide.

A STEET car of a new style of construction, designed by Mr. A. W. Eggleston, Master Mechanic of the Chicago Railway Company, has recently been introduced upon that company's line, and is described as follows: The length of its bed is 20 feet, width of platform, 2½ feet; it seats 32 passengers, and is lighted with three lamps. It has a central passage way like the steam cars, two persons occupying each seat, the seats being reversible and upholstered in red plush. The curtains are manipulated by Pullman springs. The roof is paneled in carmine wood, resembling maple in color; and the doors, sashes, seats and sides of the car are finished in black walnut, maple, mahogany and French walnut. The windows in the roof are of blue and white glass, and the side windows in summer can be taken out, thus turning the car into an open one. The central passage-way is wide and the space between the seats ample.

THE new shops of the Missouri Car & Foundry Co., in St. Louis, are very complete in their arrangement, location, machinery and general fitting up. Economy in the handling of material is a prominent feature. The grounds occupied comprise an area of twelve acres, and cost \$25,000. The machinery cost \$40,000, and the buildings, which are all one story, cost \$20,000. The works are under the supervision of Mr. David Sutherland, formerly of the Detroit Car Works, and a most competent mechanic. With a force of 450 men, the establishment will be able to turn out 12 freight cars a day. The company also has an extensive foundry, at which 200 car wheels a day can be made.

THE new ferry and freight houses of the Pennsylvania Railroad at the foot of Courtland street,

New York, have just been completed, together with two new boat-slips. No expense has been spared, apparently, to make these improvements all that could be desired. They have long been needed, and the public will especially appreciate the spacious and commodious reception room for passengers, which is so immensely superior to the old one.

THE Chicago & Alton has built a magnificent dining-car at its Bloomington shops. It is 65 feet long and finely finished in oak and walnut. As a specimen of fast work, it is said that 75 men completed 58 freight cars at these shops in one week.

THE Terre Haute (Ind.) Iron Works are in full blast. The Car Works employ 300 men, are using the M. C. B. standard axle, and their own patent slide-cover oil box, which will prevent many a journal from heating.

THE amount of rolling stock on the railroads of Massachusetts is returned as follows: Locomotives, 1070; passenger cars, 1462; mail and baggage, 390; and freight cars, 19,509. The increase during the year ending Sept. 30, was: locomotives, 33; passenger cars, 74; and freight cars, 1040.

THE Firth of Tay Railroad accident is the only one on record where there was not a single survivor, and it will go down through many generations to come with this ghastly peculiarity. In the history of disasters at sea there are many instances of such total extermination, but in railroading there is but this one.

MR. LANSING MILLIS, general manager of the National Dispatch Line, has contracted for 100 more Tiffany refrigerator cars to be added to the same number built last year for the Chicago, Boston & Liverpool Co., an organization composed largely of merchants connected with the Boston Produce Exchange.

THE Pittsburg, Ft. Wayne & Chicago has completed the third one of the new large engines for fast passenger traffic. It weighs about \$5,000 lbs. Three more are to be built.

THE new car house of the Rio Grande R. R., at West Denver, Col., is a very large one, and similar in form to an ordinary round-house. It will contain 14 stalls. The back wall will be 410 feet in length and the front 179, with a depth of 72 feet 8 inches. The roof will be sloping, resting on the wall 23 feet 8 inches high, and the rear wall 16 feet high. Together with the other buildings in the vicinity, it will form one of the most complete railroad shops in the west.

THE Columbus & Hocking Valley road has arranged with Mr. Timms, the patentee of the adjustable car-truck, to use it under 40 new coal cars which are now being built.

THE Allegheny Car & Transportation Company's works at Swissvale, Pa., have been sold to some Eastern capitalists, and will be put in operation in the spring.

THE Ohio Falls Car Works have built five postal cars for the Iron Mountain & Southern, and a num-

ber of fine passenger coaches for the Nashville, Chattanooga & St. Louis.

THE Haskell & Barker car works at Michigan City, Ind., are building 100 box cars for the Northern Pacific.

THE St. Charles (Mo.) Car Works have just made a large addition to their erecting shop, and now have a capacity of from eight to ten cars a day. They have taken a contract recently for 350 flat cars for the Atchison, Topeka & Santa Fe.

MR. CHARLES W. PARSONS has resigned his position as Civil Engineer and Bridge Builder of the Old Colony Railroad, and will take charge of the bridge department of the firm of R. F. Hawkins & Co., of Springfield, Mass.

THE Westinghouse Lighting Company has been organized at Pittsburg, Pa., for the purpose of handling lighting passenger-train cars, buildings and other structures.

THE Ohio & Mississippi company is building ten new engines for passenger and freight service, and three dummy-engines for switching service.

CIRCULAR No. 12, of the Northwestern & Grand Trunk Railway, announces that Mr. K. Blackwell is appointed Mechanical Superintendent, having charge of both car and locomotive departments, with Geo. W. Prescott as Assistant. H. W. Chester is appointed general accountant, and Wm. Bonner traffic auditor.

A PITTSBURG dispatch says: The new year finds not an idle mill in this country, and the iron men expect a further advance of four cents a pound in basic metal. An order a day or two ago to one of our leading manufacturers for steel rails at \$76 a ton was declined. Not a single mill here will sell for future delivery. With all the manufacturers the question for 1880 is that of an ore-supply for the furnaces.

It will require 60,000 tons of rails for the 600-mile extension of the Texas & Pacific railroad, which is more than one-fifteenth of all the iron and steel rails made in the United States last year.

THE Schenectady Locomotive Works turned out 100 locomotives in 1879. This is a very large number considering that work on them was not begun until the latter part of March. Of this number 75 had steel boilers and 25 iron.

THIRTY locomotives are on the stocks in the Philadelphia & Reading railroad machine shops, Reading, and some of the machinists are kept working all night. The employees of the blacksmithing department have commenced the blacksmithing for the 1,000 freight cars and 400 coal cars that are to be built at the shops.

THE Boston & Albany shops at Springfield, Mass., have turned out a heavy freight engine with 18½ by 28-inch cylinders and four 4½-foot driving wheels. The steam ports are 8 by 1½ inch in size. The weight on the driving wheels when loaded is 54,000 pounds, or 13,500 pounds per wheel.

ANOTHER large engine for the fast passenger traffic on the Pittsburg, Fort Wayne & Chicago road was recently finished in the company's shops at Allegheny, Pa. It weighs about 85,000 pounds. The company has built 550 freight cars and 14 passenger coaches during the past year.

The Lake Shore & Michigan Southern Railway has now in use a new design of car lamps, the invention of Henry C. Hart & Co., which are giving most satisfactory results. This lamp is made from the old style oil lamps with certain improvements.

BOWERS, DURE & CO., Wilmington, Del., expect to increase their working force by adding upward of 100 additional hands toward spring. They have just completed an order for freight and passenger cars for the Columbus & Sand Creek Railway, another for the Shenandoah Valley, and one for the New Jersey Central.

THE BARNEY & SMITH Manufacturing Company, of Dayton, O., has completed for the Cincinnati Southern road two elegant twelve-wheel passenger coaches. It has also delivered to the company six new cabooses for use on the mountain division.

TWO fine passenger coaches for the Kansas City, St. Joseph & Council Bluffs road were recently finished at the company's car shops at St. Joseph, Mo. They are the latest improved style, have the spoke wheel with imported Russian steel tire, and are provided with the Pullman ventilator at the top. They are magnificently upholstered with crimson, and are superbly finished inside with maple.

THE Baldwin Locomotive Works, in Philadelphia, turned out 398 locomotives in 1879, of which 84 were sent to foreign countries. They have now a large number of orders on hand.

THE Billmeyer & Small Co., of York, Pa., has taken a contract to build 450 box, 60 stock, 100 coal and 250 flat cars for the Denver & Rio Grande road.

THE Chicago & Northwestern is building fifteen new coaches at its Chicago shops. They will be most attractively built, and will rest upon "paper" wheels.

THE New York, Lake Erie & Western has recently awarded contracts to various Pennsylvania car works for the building of 2,500 new box cars. Within the last fourteen months, this company has received and contracted for 7,500 new cars.

THE Atchison, Topeka & Santa Fe company contracted recently for 1,200 cars. Wells & French, of Chicago, build 500 of the number; Michigan Car Works, Detroit, 350; St. Charles Car Works, Missouri, 250; Ohio Falls Car Works, 100.

THE Iron Mountain (Mo.) road is in receipt of two new postal cars 50 feet long, built by the Ohio Falls Car Co. This is the first installment of a lot of five which they have ordered.

THE Lafayette (Ind.) Car Works have re-commenced operations, and are filling an order for 700 eight-wheel coal cars for the Ohio Central road. The President of the company is B. F. Masten, formerly purchasing agent of the Lafayette, Muncie & Bloomington; and Chas. E. Gore, recently of the Lake Erie & Western, is Superintendent.

THE Atlantic & Great Western is to be reduced to standard gauge, and have a new name. It will also use no leased rolling stock.

SEVERAL years ago a number of enterprising citizens of Jacksonville, Ill., contributed capital and established car works in that city, equipping them with excellent machinery. The panic came before they were fairly in operation, the enterprise was abandoned, and the works have been idle until within a few weeks. Now a new company has been organized, called the Jacksonville Car Company, capital \$50,000. Mr. T. C. Dutro, of St.

Louis, has taken the management, and the works will soon be under way.

THE Peninsular Car Works, at Detroit, have a car shop with a capacity of eight freight cars per day, a foundry and a steam forge. The works were formerly known as the Detroit Car Works, and the forge as the Detroit Steam Forge. The latter has been operated for twenty-five years by J. M. Ford. The President of the Peninsular Works is Mr. T. D. Buhl, and its Vice-President, Manager and Treasurer, is Mr. Frank J. Heckler, General Superintendent of the Eel River Railroad.

THE Jackson & Sharp Company, of Wilmington, employ about 700 men in the various departments, chiefly in car building. It has had several South American orders this year, and recently one from Brazil.

#### A New Steel-Tired Wheel.

The drawings show the construction of a steel-tired wheel, manufactured by the Cooper Elastic Steel Wheel Company, of Cambridgeport, Mass.

Fig. 1.

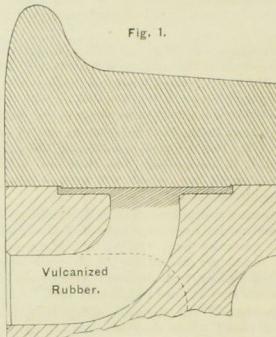
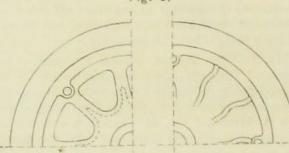


Fig. 2.



The wheel consists of a cast or wrought iron centre and a steel tire, with a vulcanized rubber packing between them. Fig. 1 is a section of the tire and centre, with the rubber packing.

Fig. 2 is a plan of both a plate and spoke wheel, showing the position of the holes into which the rubber is forced. The tire is shrunk on as usual, but its hold on the centre is further strengthened by a shoulder, which fits into a channel into the rim of centre, as shown. This shoulder is  $\frac{1}{8}$  of an inch deep, which is found to be ample, and a dull red heat only is required to allow the tire to slip over the edges of the wheel centre, a stronger heat being likely to injure the steel. The rubber is forced successively through three or four holes on the side of the centre near its rim, which open upon the centre line of the face of the channel, as shown. This forcing is done by hydraulic pressure, the gauge registering 100 tons before the process is completed, the rubber being slightly heated as it passes through the press. The vulcanizing is done afterward, and the wheel is ready for service.

The advantages claimed for this construction are:

its simplicity; also that it is a perfect steel-tired wheel even without the rubber; a spoke as well as a plate wheel can be made; a worn out tire is easily replaced with a new one—the old center not being subject to any perceptible wear under ordinary usage. The rubber packing acts as a spring to counteract the pounding blows of car and locomotive wheels at rail-joints and rough places in the track, and particularly at high speeds. It also tends to increase the life of rails and rolling stock, and by reducing the shock upon axles, renders them less likely to break at the journals and wheel seats. In experimenting with the wheel, it has been found necessary to apply a pressure of 110 tons to remove the tire after one of the side flanges of the centre had been turned out in the lathe so that the shoulder of the tire had no effect, the tire being held only by the bite caused by the shrinking on one side and the rubber in the middle; showing that the great pressure with which the rubber is forced in causes it to unite closely with the iron and steel, while at the same time it retains its elastic qualities.

The wheels are guaranteed by the manufacturer for 300,000 miles, and are now being introduced upon the New York & New England, and other eastern roads, upon some of which they have been running for more than two years with entirely satisfactory results. Mr. A. F. Cooper, of the place above named, is the patentee.

#### Color-Blindness.

This subject is very fully discussed in the report of the Massachusetts Railroad Commissioners, and attention is called to defects of vision which do not relate to discrimination in colors. While the board is not able to speak of any railroad accident as having resulted from color-blindness, it does know of cases in which considerable damage has been caused from other imperfections of vision, such as short-sightedness, and an inability to recognize the forms of signals beyond a certain distance. The danger from this source has also been confirmed by tests made by railroad officials who have found their men to be more defective in vigor of sight than in the perception of color. In reference to the latter defect, however, the conclusions of the board are, that color-blindness is an established fact, but that the extent to which men are unfitted by it for railroad employment has been greatly exaggerated; that examinations by persons other than medical experts is sufficient, except in doubtful cases, and that they should be made annually, and include all who are in any way concerned in the movement of trains. No legislation on the subject is recommended, the interest of each corporation being considered sufficient to insure the safety of railroad property on this score.

THE car-shops at Middletown, Dauphin County, Pa., are soon to resume work, and will employ 300 men.

MR. W. L. KING, who has just been appointed Roadmaster of the Cincinnati Southern Road, was for some years Roadmaster of the Indianapolis & Vincennes road.

THE Hancock Inspirator Co., of Boston, has moved to 34 Beach street, and is about to begin the manufacture of a metallic steam check for locomotives and steam engines, and of Scovill's patent safety pop-valves, in addition to its regular business.

WILLIAMS, PAGE & CO., of Boston, are now making some very fine double-light car lamps from new and handsome designs. They have been adopted by many leading roads, including the Boston & Albany, upon which several hundred are now in use. Some other roads are also substituting these lamps for their previous methods of lighting, as fast as practicable.

COMMISSIONER FINK announces that by agreement of the Eastern Trunk Lines, the following rates on passenger cars will be charged on the basis of New York to Chicago, to take effect Jan. 26: Passenger cars on their own wheels, man in charge free, no return pass, 30 cents per 100 pounds actual weight. Passenger cars on trucks (the latter to be furnished by shipper), man in charge free, no return pass, trucks to be returned, 40 cents per 100 pounds actual weight.

THE Ashcroft Manufacturing Co., of Boston, Mass., has just completed a form of pop-valve which can not be tampered with or altered by engineers. It is made with a lock-up attachment required, with brass case, and with or without relief lever attachment.

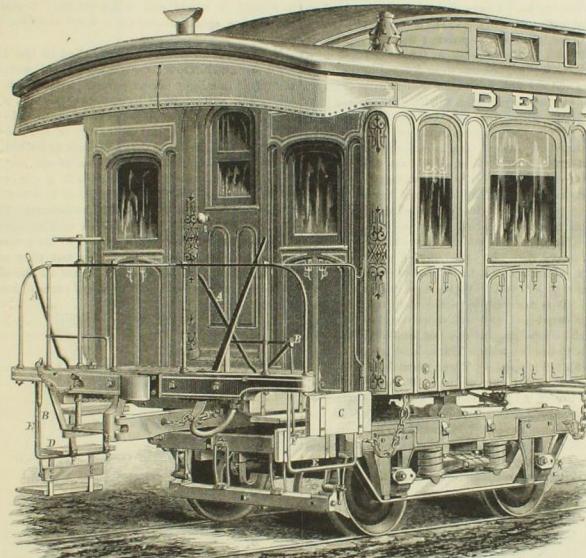
THE United States Wind Engine & Pump Co.,

BURK'S WATCHMAN'S TIME DETECTOR CO., of Boston, Mass., has just shipped a quantity of its clocks to the Burlington & Missouri River, Atchison, Topeka & Santa Fe, and Lehigh Valley roads.

A BILL to have the Winchell Car Ventilator Co. declared insolvent and a receiver appointed, has been filed in the United States Circuit Court in Chicago by Thomas H. Fletcher, a creditor.

POST & CO., of Cincinnati, will soon commence work in their new building. They have heavy orders on hand, and are receiving many new ones for railroad supplies.

THE Indianapolis, Cincinnati & La Fayette shops at Indianapolis lately turned out a very handsome passenger coach with six-wheel trucks.



AN IMPROVED CAR STEP.

of Batavia, Ill., has contracted to furnish all the water tanks and fixtures on the Denver & Rio Grande extensions. They will all have Halladay improved wind-mills and Curtis double-acting pumps.

A LOST-CAR agent for a western road recently, after searching for months for a car, found it away out the plains, forty rods from the railroad, devoid of its trucks, and occupied by an ambitious squatter at a home.

THE Barnum & Richardson Manufacturing Co., Chicago, has been so full of work at its Clinton street shops that it is refitting its wheel foundry on 23d street, which will give employment to 75 men.

THE Hinckley Locomotive Works in Boston were sold at public sale by the Trustees, Jan. 14, and bought by Alexander S. Porter, acting for Greeley S. Curtis, Robert H. Stevenson and Charles L. Pierson, of Boston.

THE Washburn Steel Wheel Co., Hartford, Conn., is full of work turning out wheels for the Michigan Central, Old Colony, Eastern, Fitchburg, and Galveston, Harrisburg & San Antonio roads,

THE engraving shows an improvement in passenger car steps, the object of which is to prevent climbing and jumping in getting on and off trains, and the hazards incidental thereto. A folding step, C, is connected with the lower car step, so as to let down when in use to within a foot of the ground, and be elevated when the train starts, so as to form a barrier against passengers getting on or off. This is done by the levers, A, which operate the steps and hold them in either of the two positions shown in the cut. The advantages of this arrangement are quite obvious. The risers of the steps can be shorter and easier to mount; when folded up, the lower step will be less exposed to obstructions, and when let down at one end only of a car, the passengers will be compelled to enter or pass out at that end. As an offset to these advantages there will be of course the additional trouble of operating the steps. We are informed that the invention has been thoroughly tested in practical working, and that the steps are now in use by the Delaware & Hudson Canal Company. Further information may be obtained by addressing Mr. M. E. Skerritt, No. 4 High street, Albany, N. Y.

## Correspondence.

### Activity in Car-Building at the West.

CHICAGO, ILL., Jan. 24, 1880.

To the Editor of the National Car-Builder:

The great business "boom" still continues in the northwest, especially as regards railroad transportation and all collateral industries. The demand for supplies is so heavy as to tax very severely the capacity of manufacturers. The car-builders throughout the west are overburdened with contracts, and some of them will continue to be for months ahead. The difficulty of procuring the necessary supplies and material for construction so as to fill orders with any degree of promptness is very embarrassing, and in one instance has caused a temporary suspension of operations. Shops that have been idle since 1873, and others which never filled a contract until recently, are now paying investments, or are rapidly becoming so. New car-building enterprises are being projected and the capacities of old ones enlarged to meet the present and prospective demand, until it seems almost a wonder where all the cars are to be used and how they are to be paid for. The steady growth of freight tonnage during the past six years of depression in general business, is a phenomenon which explains the present activity, and augurs well for the future prosperity of railroads. The cloud had a silver lining after all.

The grain product of the west appears to be inexhaustible. It comes pouring into this great focus of business at the rate of 700 car-loads a day on a fair average, since the close of lake navigation, until our elevators, with a capacity for over 15,000,000 bushels, are full and running over. Our packing-houses put up 50,000 hogs a week, and immense quantities of bulk meats destined for European markets are going forward in refrigerator cars. This affords some clew as to how all the new cars are to be employed. An analysis of the return or west-bound freight would be interesting. One of our leading roads, the well-known C. B. & Q., has sent out from this city daily for some time past, more than 400 car-loads of merchandise, and other lines do a proportionately large western business. Now, where do all these goods go to, and who consumes them? The long trains, westward bound and full of emigrants, explain the mystery. It is a current that flows unceasingly. These people take a large amount of money, in the aggregate, to their new homes, and buy few household goods and farm implements. For a year or two they are buyers of various lines of merchandise, the transportation of which greatly helps the roads and gives employment to their rolling stock.

The present tide of prosperity is very naturally bringing the labor question to the front, and workmen are discussing the relation of wages to the enhanced prices of living, and wondering when the boom will reach them; and so prices react upon each other until there is a fair prospect of getting back to where we were before the great panic. Notwithstanding the large advance in iron and steel, it is predicted that the present year will witness a much larger mileage of new construction than for any one year since the old flush times. Many contracts for rails and track supplies have been made by western roads for the current year, and some difficulty has been experienced in securing early deliveries for March and April. One road, it is said, contemplates building 1,000 miles of new track provided the season is sufficiently long and the requisite supplies can be obtained. The rumored intention of Mr. Vanderbilt to withdraw from his roads all lime-cars except those of the Merchants' Dispatch, is said to have had a depressing effect in some quarters, one car-loaning and building establishment having some 7,000 cars in these lines.

On the other hand, the large additions to their

car equipment which the eastern trunk lines intend making, and which is reported as high as 20,000 cars in the aggregate, added to those contemplated by western roads, indicate that the car shops will have plenty of work for some time to come, and at remunerative prices. The old starvation prices, at all events, cannot be maintained in the face of the enhanced cost of material and labor. The cars built during the past year have been of diversified styles of construction, according to individual specifications, little or no regard being paid to the recommendations of the Car-Builders' Association as to uniformity of parts. Some have end platforms and some not, ladders are placed in various positions, and axles and journals of different dimensions are specified, just as if no nominal standard had ever been discussed or agreed upon. I would suggest that some of the influential advocates of the so-called "M. C. B." standard, do a little missionary work among the refractory brethren here in the west. What is the use of associations, committees, discussions and recommendations if no attention is paid to them? And, by the way, where is that "Dictionary of Terms?" It ought to be, and doubtless will be, a very complete affair, considering the time devoted to its preparation, and when widely distributed among the railway car departments it will doubtless tend to bring harmony, to some extent at least, where there is now an almost endless diversity.

Among the heavy manufacturing establishments of this great commercial center of the northwest, one of the most conspicuous is the Pullman Car Company, to whose enterprise the traveling public is indebted for those sleeping-car facilities by which one can journey night and day in almost any direction without transfer or delay. And yet, while recognized at home and abroad as having originated and perfected the sleeping-car system, some of our own roads are still running their own sleepers. Even the admirably managed Rock Island & Pacific has heretofore thought it expedient to do this, but I am glad to note that this part of its business has, since Jan. 1, been placed in the hands of the Pullman Company.

RIPLEY.

## Freight-Car Construction.

*To the Editor of the National Car-Builder:*

The matter of freight-car construction is just now attracting a good deal of attention among railroad men, and opinions are about as various as are the different kinds of cars. If there is ever to be a standard of uniformity for the different classes of these cars, these conflicting opinions must in some way be reconciled, and the question is, How can it be done? The only practicable way would seem to be for the men who are the most familiar with freight transportation in all its intricacies, to agree upon certain styles and dimensions that will best accommodate the various classes of freight. A careful inspection of shipping-books would indicate what proportion of freight could best be carried in short or small cars, and what proportion in longer or larger ones. When the sizes of these cars respectively have been fixed, then let the details of the construction, in whole or in part, be left to the master car-builders with the understanding that what they agree upon shall be accepted and made binding upon all the roads so far as new work is concerned. A standard axle has been agreed upon by the car-builders and master mechanics, and their action in this respect has been very generally concurred in, and it is only a matter of time when all new axles will conform to this standard. We have also a standard 33-inch wheel, this size being practically recognized as such. Now, if in addition to these two leading and essential things, a uniform style of truck could be agreed upon, together with a drawing and buffing attach-

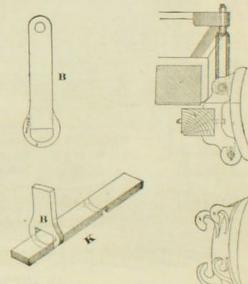
ment, everything would be in good shape so far as repairs are concerned—the repairing of the car body not usually requiring material of special patterns to be kept in stock.

In making these suggestions I am not unmindful how difficult it is for men to give up pet theories and individual opinions, to say nothing of established custom sanctioned by long usage. The long, heavy car in such general use is undoubtedly the best adapted to certain kinds of freight, such as railroad iron, timber, and whatever material necessarily distributes its weight over the whole length of the car, thus relieving the center from a tendency to sag and vibrate. On some southern roads there are cars from 35 to 40 feet in length, built expressly for cotton, and for this particular purpose they do very well, but they are pretty sure to get loaded with other and heavier freight which is rarely distributed so as to have the right proportion over the trucks. I have, indeed, seen them when loaded with tobacco, sag in the center so the brakes had to be taken off to prevent their dragging on the track. Cars running in this condition on a rough track, soon become loose-jointed in the body-frame and the nails work loose in the siding. Thirty-foot coal-cars, when loaded with 12 tons, are subject to the same difficulty, but 24 feet cars will carry 13 tons without sagging or any excessive vibration. A train of freight-cars was once wrecked because one of them, a 30-foot flat-car, was loaded with a large rock which broke the car in the center and wrecked all the cars behind it—the weight of the rock being considerably less than a load of iron rails carried by it on the preceding trip. Practice has shown very clearly that for long, heavy cars, the load carried can not with safety exceed the weight of the car, and that an increase of length or weight does not change the ratio. It is asserted by some that the standard axle is capable of carrying more weight of car and load than this proportion, but experience shows that a 10-ton car with a 12-ton load, gives trouble with  $3\frac{1}{2} \times 6$  journals. These journals have a bearing surface, per car, of about 66 square inches, while the  $3\frac{1}{2} \times 7$  journals have a bearing surface of 82 square inches, the ratio to load being about the same in both cases. Writers upon this subject, even those of practical experience, are apt to lose sight of one important point relative to the axle. In making their estimates they base their calculations on the new or unworn axle, whereas the axle begins to wear at once, and is not condemned by rules of inspection until the journals are reduced to  $2\frac{1}{4}$  inches, nor do they take into account the fact of weakening by crystallization. It is the axle, at its condemning point, that should be made the basis of calculations, as such axles are liable to be in any car that has been a long time in service.

Practice having established the rule of ton for ton, in reference to the present style of cars and their loads, and that any excess of load is attended with hot journals, bent and broken axles, etc., attention must be turned in some other direction to settle the dead-weight question. The advocates for a short, light car are sanguine that the use of such cars will lessen the proportion of dead-weight. A long car shortened one-fourth, or even one-third, will carry the same load with greater safety, the only question being as to its capacity for bulky freight. In this case we reduce weight at the rate of about 400 lbs. per linear foot of car body, or from 1 to  $1\frac{1}{2}$  tons. For the heavier freights, the car would have ample capacity. There are many other things, however, to be considered, among which are the standard axle and 33-inch wheels. The lighter axles will not stand a 12-ton load with due regard to economy and safety, and the standard axles will not carry 7,000 lbs. to a journal under four-wheel cars. There is no question as to their safety under 5,500 lbs. to a journal, when they are new, but as the journals constantly grow

smaller by wear, and the axle weaker, it would not be advisable to lessen their dimensions even for the lighter cars. In such case the reduction would fall on the remainder of truck and on the car body. The most improved trucks weigh about 8,000 lbs. per car—wheels, say from 4,000 to 4,500, axles 1,400, oil-boxes 725, and the residue about 1,700 lbs. I have no doubt that trucks could be built on an improved plan that would not weigh over 6,000 lbs. per car, and carry from 12 to 15 tons of load, car and all, thus leaving 4,000 lbs. in a 10,000 lb. car, or 182 lbs. per linear foot, while the ordinary body-box weighs 400 per foot, and the four-wheel cars a little more—their average stenciled weight being 11,250, from which deduct 2,700 for wheels and axles, leaves 8,550 for car-body, or 437 per linear foot. A body 22 feet long, at 400 lbs. per foot, would weigh 8,800 lbs., and 6,000 for trucks would be 14,800 in all. With the car reduced one-fourth in weight, it would still weigh 12,600. I would like to see specifications for a 9,000 or 10,000 lb. car.

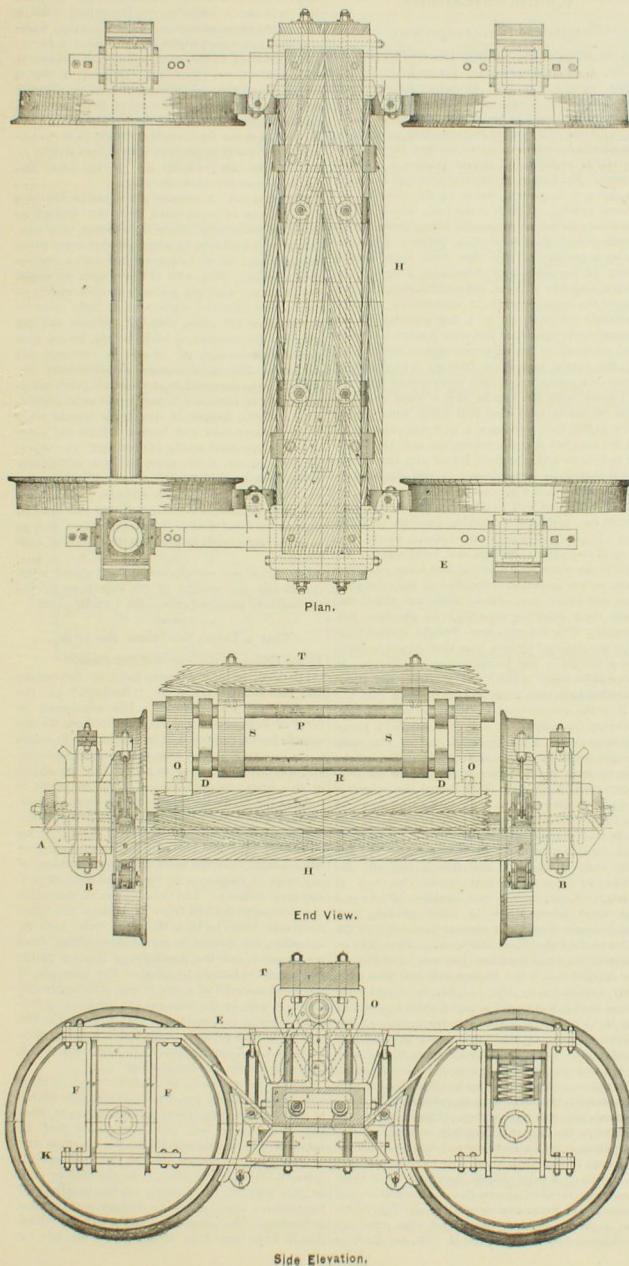
Mr. Latchin, in his article published in the December *Car-BUILDER*, says that 3,350 lbs. weight per wheel in a light car as against 5,000 lbs. in a heavy one, will admit of lighter wheels, axles, etc. But if he reduces size of journals in same ratio as load, what is gained in the matter of hot boxes, etc.? There is no doubt that a car can be built that will carry two tons of freight to one of car, but it is extremely doubtful whether such a car will stand strains of draft and concussion to which it will be subjected in trains and in switching. The wagon-makers have no trouble in making truck vehicles that will carry from three to six pounds to one, and often over rough roads, but they run singly and at slow speed, which makes all the difference in the world. The four-wheel car is lighter,



simply because it is shorter and without trucks. Those on southern roads have a 11-foot wheel base, and some of them 48 journals, the brasses weighing 16 lbs. Still, under a 12-ton load, there is much trouble from hot journals and broken springs. In an experiment on a short curve with two of these cars, one loaded and the other empty, the empty car would mount the rail three times out of four, the loaded one keeping the track, also the ordinary 8-wheel engine with an 8-foot wheel base. These cars when loaded with 12 tons, carry about 8,450 lbs. on each journal, and are regular rail-breakers and joint-pounders. On the Chicago & Alton, these cars have a 10-foot wheel base and are 20 feet long. They all sag at the ends and are high in the center. I am confident they will ultimately have to be given up; indeed, I consider them condemned already. But I will not revive a controversy which time and service will definitely settle at no very distant day.

M. M.

MR. C. D. FERGUSON has been appointed Acting Roadmaster of the Little Miami Railroad.



## A Suspension Car-Truck.

The drawings represent an end, top and side view of an improved car truck designed as a standard for freight and passenger service. The objects attained by this construction are described as follows:

First, to receive all lateral motion or shock from any inequalities of the track singly on each pair of wheels with their axles and boxes, without transmitting such motion or shock to the truck frame; or, in other words, instead of increasing this lateral movement of the wheels and axles by interposing lateral springs or swing-bolster links between the truck and car body (heretofore considered so indispensable), the shock is taken up and exhausted at the contact of rail and wheel, thus doing away with the necessity of a swing-bolster. This is done by the construction here shown.

The journal-box *A* is of the ordinary kind, except that it allows no lateral play of the axle and is high enough to admit a spring. Closely bearing against the sides of the box are lateral swinging links *B* suspended from the pin *C*, which rests upon the spring cap as shown. The lower ends of the links receive the bar *K*, which is the lower bearing surface of the truck, and sustains the weight of truck and load distributed by the bars *E* and *F*, the bars *F* housing the links and protecting them from any strain in the line of travel or any twisting or uneven strain upon the axle box. The sides of the truck frame are connected by the cross-beam *H*, to which are firmly bolted the upright standards *O*, which are connected by the shaft *P*, this shaft being the upper bearing surface of the truck. The axles are at all times parallel to each other and rigid with the truck frame in the line of travel, this being the only direction in which a car truck should move. The weight of car and truck resting upon the links *B*, always tends to keep the links vertical, and any force arising from irregularity of track will move either pair of wheels temporarily to one side or the other, with no effect but to slightly incline the links connecting that pair of wheels on each side of the truck from the vertical. So in the constant tendency of both pairs of wheels to find the lowest points in the track—no track being perfectly level, and the points of depression constantly changing—they can do so not only without affecting the car, but the truck itself will not be disturbed, except that it is raised vertically a distance equal to the versed sine of the angle between the inclination of the links and the vertical. If such lateral position of the wheels is long maintained, gravity will, of course, cause the truck and car to follow; but, in passing bad joints, low spots, switches, frogs, etc., each pair of wheels, independently of the other, will jump to one side and immediately return, caused by the weight of the car and truck inclined from the top centre of links, and the truck with all its parts will remain unaffected.

A second object of this construction is to modify the force of concussions, longitudinal and vertical, imparted from truck to car body, or vice versa, by enabling the truck to move freely forward or backward, to a limited extent, and independently of the car body, and the car body also independently of the truck. The means employed for this purpose cause all perpendicular shocks on the truck to be received in angular instead of direct vertical lines, as when the car body is held longitudinally rigid on the truck by centre-pins. The concussion of the bumpers is also softened and the strain upon the draw-bars relieved, as well as the unpleasant motion attending the application of the brakes.

As in the first instance, the truck frame is suspended laterally below the axles, in order that it may not be disturbed by the irregular lateral movements of the wheels and axles; the car body is also suspended longitudinally below the truck frame in order that it may not be jarred by the

irregular forward and backward movements of the truck, and that it may move a trifle in advance of the truck in starting, instead of starting truck and car simultaneously. To accomplish this, two longitudinal swinging links *D* are suspended from the shaft *P*, through the lower ends of which is the shaft *R*, which firmly holds the car body by the reverse car standards *S*, which are bolted to the car body bolster *T*. The ends of the shaft *R* have a direct bearing against the truck standards to prevent any lateral swing of the car body upon the truck.

A third object of the invention is to afford better means for the swiveling or turning of the truck relative to the car body, and to utilize the draft and momentum of the train together with the gravity of the car, to prevent almost entirely the grinding of the wheel flanges against the outer rail in curving. The turning of the truck is provided for by rounding the ends of the shaft *R* on each side forward and backward from centre, sufficient to allow it to move in the arc of a circle described from its opposite end, and rounding out or counter-sinking both sides of both holes in the links *D*, so they are free to swivel as well as swing on the shafts. This dispenses with center plates, king-bolts and side-bearings, with their attendant friction. The grinding of the flanges in curving is prevented by the links *B* and *D* and shaft *R* working harmoniously together. When the car strikes a curve from a tangent, the leading pair of wheels cause the links *B* to incline from the axle boxes outward from the curve, and by changing the line of travel of the truck from the line of momentum of the car, changes the previous position of the links *D* and shaft *R* relatively to the truck, the lower end of the inner link dropping back to the vertical, while the lower end of the outer one is raised further from the vertical, which turns the truck at an angle to the car body and tilts the body inwardly, bringing most of the draft upon the outer link and most of the weight upon the inner one. It being a mechanical impossibility for the various parts to assume any other position than those indicated, the axles and wheels are so acted upon by the sliding of the links *B* against the axle boxes as to cause the outer wheels of each pair to move ahead of the inner ones, and so accommodate themselves to the varying lengths of the two rails, bringing the transverse centre line of the truck to the radial line of the curve, and causing the inner wheel to roll perfectly on the inner rail—all the slipping being done by the outside wheel, as the greater part of the weight of the car is supported on the inside links *D*. The centrifugal force has an active resistance to meet, other than the lateral swing links, in the tilting of the car body by the links *D*.

The detached drawings on left-hand page show the link *B* and its connection with the bar *K*, also the brake attachment.

The truck is in use on cars of the Prospect Park & Coney Island R. R.; and also the Merchants' Dispatch and Peipher Lines. It has also been carefully tested by the Harrisburg Car Co. and the Jackson & Sharp Co. The Suspension Car Truck Co. (Bennet's Building), New York, is the owner of the patent, who may be addressed for further information. A very complete working model of the truck may be seen at their office.

THE Chester (Pa.) Steel Castings Company has, within a few months, doubled the capacity of its works by enlarging the foundry building, erecting a larger furnace, engine, boilers, etc. It are now filling twice as many orders and turning out double the work it did last spring.

\* THE Keystone Car-Spring Works of Philadelphia are making 40,000 springs for the Pennsylvania Railroad, and also have large orders from several trunk lines.

## Communications.

### Light and Heavy Freight Cars.

To the Editor of the National Car-Builder:

Mr. A. B. Latcha, in his "Plea for Light Freight Cars," published in your December number from the *Railroad*, makes some very plausible deductions. But were I to undertake a reply to Mr. L. Garey's remarks at the June meeting of the Car-Builders' Association, or to discuss the "transporation problem," I should pursue a different course. Mr. Latcha thinks the principal weakness in cars now in general use is in the distance between trucks. If this is the case, why is it that such cars do not as a general thing break at the centre before they do at other points? By examining a number of sills that have been thrown away in repairing and rebuilding, I have found that a majority of them, notwithstanding the cars are of the ordinary mode of construction, which is certainly not good, are in a fair condition at the centre; and experience certainly teaches that cars, and particularly box cars, very seldom break down in the centre, and when they do, it is generally from concussion in addition to weight of load.

I agree with Mr. Latcha that a short and narrow car can be built that will weigh when empty only 10,000 lbs., and have a carrying capacity of 16,000 lbs., but it would necessitate radical changes in the construction of both frame and truck from what is now in general use. I will also venture the assertion that a car can be built 30 ft. long by 8½ ft. wide that will weigh when empty not over 20,000 lbs., and have a carrying capacity of 40,000 lbs. The only question in my opinion would be in respect to journal bearings and lubrication. We find in use some poor material and some good, and more or less attention is required to keep the journals cool under cars whose loads are much less than their carrying capacity. In practice, particularly with through time freight, spoiled bearings are replaced by new ones that do not quite fit the journals, or the journals may be rough. In these cases there will be hot journals, and if not attended to in time there will be trouble.

Now the question arises, what is the practical carrying capacity of an axle for standard gauge roads, made of good material and of the same weight as the M. C. B. standard axle. Mr. Latcha throws some light on the problem. He assumes that to load a car with 7500 lbs. to the wheel is not practicable. If this is so, why are so many of the cars of which he speaks now running on the Lake Shore road, and why are the Penn. R. R. folks building cars of 40,000 lbs. capacity, and with only 8 wheels? But this is not all. He refers to the fact that while he was at Adrian, Mich., about the middle of August—a time when there is more trouble from hot journals than from broken axles—one of the axles of the Lake Shore cars broke. There was no trouble, it seems, from hot journals, and I am of the opinion that if the broken axle had been carefully examined by Mr. Latcha, he would have found that it was made, as many axles are, and as the M. C. B. standard axle is in particular, in disregard of some of the fundamental principles of mechanics. I have examined some of the new 20-ton cars of the Pennsylvania Railroad, above referred to, and which I presume were loaded with that weight, but there were no indications that the journals had been running hot. If there is any such tendency, the fact will certainly be apparent in a very short time, as new journals and bearings are more apt to heat than those that have been longer in service. I have doubts, however, that these cars will give entire satisfaction. I noticed several points about them that seemed to me objectionable, a prominent one being that the axles are conformed very nearly to the M. C. B. standard. I

think it safe to conclude that an axle can be made that will carry 7500 lbs. to the wheel with a reasonable degree of safety. Hence, we may build cars that will weigh 20,000 lbs., and have a carrying capacity of 40,000, or two pounds of freight to one pound of car. Now we will suppose that a 30-ton locomotive is capable of hauling 800,000 lbs. on a given grade. Thirteen of these cars will weigh 260,000 lbs. and will carry 520,000 lbs. paying load, a result that would certainly be more satisfactory than 31 small cars with a dead weight of 310,000 lbs., and 496,000 lbs. paying load—Mr. Latcha's most favorable showing.

Nor is this all. I presume it will not be disputed that the cost of equipment does not depend so much on the weight as on the number of pieces, and it will doubtless be admitted that every piece should render its maximum service with a due regard to safety. Now, with 13 heavy cars, we would have 52 axles, with 104 journals and 104 wheels to inspect and attend to, while with 31 light cars, we would have 124 axles, with 248 journals and 248 wheels. The number of brake-beams, levers, connections, fastenings, etc., would be increased 138 per cent. The small repairs, so pertinently discussed by the car-builders at their last year's meeting, would be increased in nearly the same proportion, and the danger of disastrous wrecks from fallen brake-beams and broken wheels and axles would be increased nearly 140 per cent. The superstructure of our roads must be made sufficiently strong to bear our heavy locomotives and passenger cars; the bridges also must be proof against any more Ashtabula disasters. Either this must be done or we must change the entire system and go back for our models to the primitive days of railroading.

[We wish our correspondent had stated more specifically the ground of his objections to the car-builders' standard axle.—ED. CAR-BUILDER.]

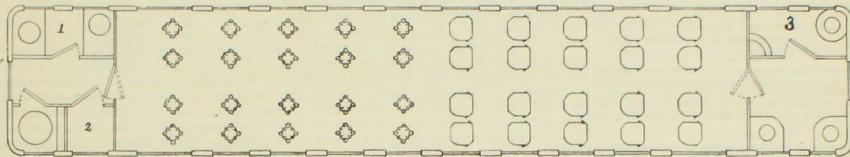
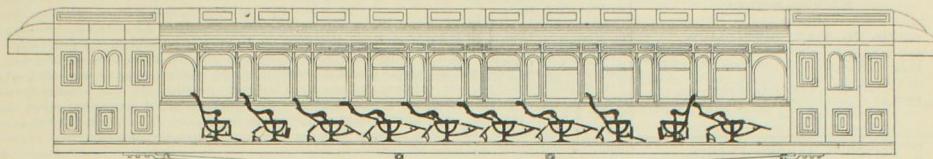
### What a Kansas Car-Painter Has to Say.

To the Editor of the National Car-Builder:

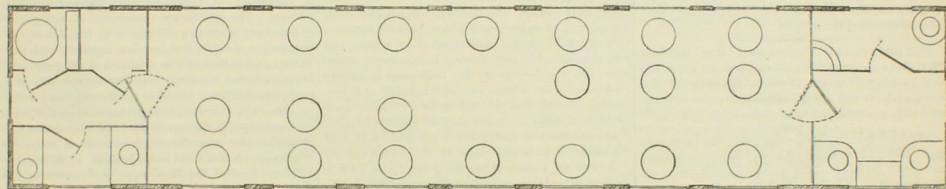
I noticed, in your January issue, an interesting and instructive article by "Buckeye" on the painting of passenger-cars. His arguments in favor of light colors in preference to dark for the outside finish, can not well be refuted, as it seems to me, so long as the two essentials of economy and durability are kept in view. But my object in this brief communication is not so much to endorse his views in regard to the outside treatment of cars in the paint-shop, as to bring to the notice of your readers the fact, hinted at by "Buckeye," that all master car-painters should, on account, have the most stalwart shoulders of any class of employees in the mechanical departments of railroads. And this, because his discretion and judgment derived from experience are often overruled, while he is, at the same time, held responsible for defects in painting resulting from poor lumber and the deviltries of inferior paints and varnishes bought by others. For example, if the wood material of a car is not sufficiently seasoned, it will, by the time the car leaves the paint-shop, become so contracted, that the putty in the nail-holes will project beyond the wood surface and give a bad appearance to the job, and this is generally credited to the painter.

If, on the contrary, the lumber used is thoroughly dry, and the car, when completed, is placed in a leaky and dilapidated paint-shop, as is often the case, where both rain and snow find an entrance, the lumber will absorb the moisture and swell beyond the putties, once so level and smooth—the ill effects being charged to the lack of skill on the part of the painter. In the painting of locomotives, also, he has to contend with similar difficulties. The sheet-iron and castings, which should have been kept within doors, are left ex-

HORTON RECLINING CHAIR PASSENGER CAR.



Length of car body, exclusive of platforms 54 ft.; Width 9 ft. 3 in.; Length of Chair Room 42 ft.; Distance between Chairs 4 ft.;  
1 Ladies Toilet, 2 Closet, 3 Gent's Saloon.



HORTON NARROW GAUGE RECLINING CHAIR CAR.

Length of body 42 ft.; width 7 ft. 9 in.; Chair Room 30 ft.; Chairs 4 ft. apart.

posed to the weather, until the rust makes such progress, that the original surface can not be restored. The paint is applied, and in six months the rust regenerates where it had previously been scraped off, and throws off the paint in large flakes. This is the fault of some one else besides the painter. These are facts, that in justice to car-painters should be ventilated, and I do not know of any better medium for that purpose, than your valuable journal. *Fiat justitia, ruat cælum.*

JAYHAWKER.

#### Car Painting—Light Colors vs. Dark.

To the Editor of the National Car-Builder:

In the January issue of the CAR-BUILDER, I notice that your correspondent "Buckeye" rings some excellent changes on the colors used by carriage-painters, and echoes the sentiments of many of his brothers in the craft; but, as dark colors are preferred by the officials of many roads, why not employ means to make them as permanent as those mentioned by "Buckeye" as being the most durable?

Carriages are painted dark as a general thing, and the colors are found as permanent as light colors would be; in fact, most carriage-painters think that dark colors, such as Indian red, umber, olive green, etc., are superior in point of wear to light colors of any kind, and, in order to have the reader see the situation as I see it, I wish to loan, for a moment, my opera-glass.

Dark colors fade or die out, principally from loss of oil in the paint, and this oil is neutralized

principally by absorption into the wood, or under-coatings of paint, hastened by heat of the sun and dry air. Now, the aim of the painter should be directed against the destroyer, *absorption*, if he would overcome the difficulty. Close the pores of the wood, for it is these minute cells which draw in, by capillary attraction, the oils; and, still further, close the pores in each coat of porous paint, applied before the color is spread upon the work. The under-coats on cars, such as "rough-stuff," or lead-filling, are porous, and if the surface made by either of these be rubbed smooth, it will be found that water readily enters the pores, and remains there until evaporation removes it. This, then, is the sucker that saps the life out of the color and the varnish.

The modern carriage-painter employs a method of painting which effectually prevents the loss of oil by absorption, and we find that he is quite competent with the lasting qualities of his coloring, and his varnished surfaces. He has found the proper spot, or bull's-eye, and his aim is ever directed thereto; and if friend "Buckeye" will give the proper depression to his Gating, and line his sights with *absorption*, he will blow to the winds all difficulty with dark colors.

F. B. GARDNER, of "The Hub."

#### Horton Reclining Chair Cars.

THE cuts represent a horizontal section and plan of a car furnished with the Horton Reclining Chairs, also a plan of a narrow gauge car, in

each of which is shown the position of the chairs and their adaptation to the comfort and convenience of the occupants. They are constructed so as to turn on a pivot instead of being reversible, and have also an automatic head-rest and an adjustable leg and foot rest. Each chair is independent of the others, and can be used by one passenger only. The seat-cushion is easily removed for cleaning, and as they are all exactly alike, there is no trouble in replacing them. Under the front edge of the seat is a lever connected with a ratchet and pawl, which enables the occupant to adjust the chair to almost any required angle, and hold it in such position. It is also easily revolved, so the seats can face each other without interference or crowding; it is, in fact, an arrangement by which passengers can have a comfortable sleeping-conch day and night, or whenever they may choose, and also a parlor and reading-chair during the day. These chairs will be found very desirable for travelers who have occasion to ride only a part of the night, and on this account will tend to increase local night travel. They can be put into any first-class car, and have already been introduced upon 17 different roads at the West, comprising in all 48 cars. The inventor and manufacturer, Dr. N. N. Horton, Kansas City, Mo., has recently added some additional comforts to these chairs in the way of portable mattresses, pillows, sheets, and blankets, to be supplied by the porter when required, and at a price within the reach of those who ride but half the night.

## The National Car-Builder.

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BY

R. M. VAN ARSDALE,

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JAMES GILLET, Editor.

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## EDITORIAL ANNOUNCEMENTS.

**Subscription.**—ONE DOLLAR a year in advance, postage prepaid. One copy will be sent free for one year to any person sending us five new subscribers.

**Advertisers.**—Business letters should be addressed, and drafts and money orders made payable, to THE NATIONAL CAR-BUILDER. Communications for the attention of the Editor should be addressed EDITOR NATIONAL CAR-BUILDER.

**Advertisements.**—Nothing will be inserted in this journal for pay, except in the ADVERTISING COLUMNS. The editorial department will contain our own views and opinions, and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.

**Contributions.**—Articles relating to railway rolling stock, construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.

MESSRS. A. WILLIAMS & CO., 288 Washington street, Boston, Mass., are authorized to receive subscriptions to the CAR-BUILDER. Single copies may also be obtained from them.

THE first month of the new year brings the CAR-BUILDER upward of 500 new subscribers, for which our friends will accept thanks. We desire in this connection to call special attention to the very liberal inducements offered to clubs.

WE have been compelled to defer until our next issue several illustrated articles, including descriptions and drawings of the standard stock car of the Missouri, Kansas & Texas Railway, and an improved iron freight truck in use on a leading line of road.

THE new "suspension" freight and passenger car truck, illustrated and described on another page, will attract the attention of railroad men. An excellent working model may be seen at the office of the company, in the Bennett Building, corner Nassau and Fulton streets, New York.

## ACCIDENTS TO FREIGHT TRAIN MEN.

It is stated in the report of the Railroad Commissioners of Massachusetts for the year ending Sept. 30, 1879, that during that year 169 passengers were injured from causes beyond their control, in the various accidents that occurred, and that 17 of this number were killed. It is also stated that 88 employés received injuries, of which 28 were fatal—71 of the whole number being train men. And it furthermore appears that of these 71 no less than 25 were injured while coupling or uncoupling cars, and 24 by falling from freight trains. These casualties were formally reported to the commissioners, and their number is not likely to be exaggerated. With respect to the accidents to freight train men, this specific statement affords the basis for a conjecture as to the whole number of this class of employés killed and crippled every year on all the roads in the country. It matters not, however, what the precise number may be. It is larger no doubt than even train men themselves would like to admit. The practical question is, Where does the fault lie, and what can be done to diminish the dangers incident to this branch of the service? It will be observed that in reference to these accidents to employés, the report does not say that any of them occurred from causes beyond their control. They simply occurred. The causes

obviously might have been controlled more or less by somebody, but they were not—and what is to be done about it?

When a railway train, away off in Scotland, goes to destruction with not a single survivor, the world is shocked because it is so extraordinary, instantaneous and complete; but when a thousand men are slain per annum, here and there, and one at a time, the fact is not announced in startling bulletin nor is any body very greatly shocked thereby. Railroading, like going to war, is a dangerous occupation, and those who engage in it voluntarily assume the risks. The thousands of freight trains moving night and day and at all seasons, are none of them short-handed for the lack of men. There are ready recruits to fill all vacancies caused by accidents or otherwise, and for small wages at that. The occupation is, in fact, alluring and attractive; it enables those who engage in it to travel about and see the world; it is active, adventurous, and free from humdrum monotony and stagnation. Every one who goes to war don't get shot, nor does every freight train man get crushed or run over. Admitting all this, the question still presents itself, Who is the most at fault, as between the men and the road managers, for the numerous accidents that are constantly occurring? We answer that both are at fault, and that if a correct balance could be struck, it would probably be found that the men are more to blame than the managers, especially in the matter of coupling cars, and in reference to accidents that occur in the yards. No rational being possessed of a modicum of sense would place himself between two cars to be caught and crushed or tripped, up and run over, for any money inducement whatever; but it is done every day from mere foolhardy recklessness, or innate shortsightedness and stupidity. To say that the men must do this or cause delay in making up trains and so get discharged, does not alter the fact. We have been told, and we believe it to be true, that if the men were required to use a stick in handling the links, and in no case to go between cars while one was approaching the other, under penalty of dismissal from service, they would as a rule prefer to dispense with the stick and take the chances in the regular way—or, in other words, deliberately walk into a trap, knowing it to be such, in which thousands have been already caught, and more will continue to be caught until a self-coupler is forthcoming that will not only couple the cars, but keep foolish men from getting between them when they ought not to.

There are appliances now in use that are a great protection to the men who do the coupling, and so far as they are not applied to cars when their merits are obvious, it is of course the fault of the managers.

In reference to the system of hand-brakes on freight trains, it seems that a good deal more might be done than has been to diminish the hazards attending it, until the time shall come—as yet we fear a good way off—when the miserable hand-brakes shall be superseded by automatic power brakes that will be as effective for freight as they are now for passenger trains. The train hands themselves ought to know best what additional means of protection they need to keep them from being thrown from the cars or from falling between them, or from being caught by bridges. According to the *Railway Globe* (Toronto) the men on the Canada roads say that their greatest danger is in passing from one car to another, and in applying the brakes. They ask for "a stout railing at the ends of cars, with supports a foot apart and about  $2\frac{1}{2}$  or 3 feet high, with a passage-way 2 or 3 feet wide, and in this passage-way an unruled platform extending from one car to the other." A platform would be objectionable on account of the difference in the heights of cars, but the running-boards might be widened and made to extend sev-

eral inches beyond the car-ends. This, with the end-railings asked for, with a good arrangement of steps, hand-holds, and ladders, and with the brake-sticks uniformly on the same side, would reduce the danger to a minimum; and this, except the railings, is what the car-builders, with the concurrence of the yard-masters, recommended at their last year's meeting. All that remains is, to have the recommendations carried into effect as fast as practicable, and this depends to some extent, we suppose, upon the managers.

## RAILROAD CONSTRUCTION IN 1879.

The *Railroad Gazette* sums up the record of new construction during the year 1879, which shows the following comparative results :

Year.	Miles.	Year.	Miles.
1872	7,340	1879	2,469
1873	3,883	1877	2,301
1874	2,025	1878	2,916
1875	1,361	1879	4,439

These figures include the mileage upon which track was laid, and not merely that which was actually opened for business. Adding the 4,439 miles constructed in 1879 to the 81,841 miles reported by "Poor's Manual" as the total construction at the close of 1878, we have the grand total of 86,263 miles in the United States at the beginning of the present year. This, upon the basis of 49,500,000 population, is an average of one mile of railroad to every 574 persons. This is far greater than the European average, which is estimated at only one mile for every 3,300 persons. The difference, however, is easily accounted for when the difference in the density of population is taken into account, together with the extent and nature of the products of the two continents and the location of the great markets for their distribution. Great as this average may seem in our own country, the proportion of railroad mileage to population is likely to be very much increased in the near future, because it is actually required. Of the 4,430 miles built in 1879, nearly 3,300 are west of the Mississippi river, and it is in this region that a remarkable development of railroad enterprise is likely to take place. Within the southern States proper, including all the territory south of the Potomac and Ohio and east of the Mississippi rivers, (with Louisiana) only 496 miles of new construction, or a little more than 11 per cent of the whole are reported for the past year, while, for the six New England States, only 40 miles are reported. The middle States have only 137 miles.

This indicates that in the older and more populous States the construction of long and costly lines has reached its climax, and that any future increase will be subsidiary and limited to local needs. In reference to the prospective new construction for 1880, there is one drawback which may cause it to fall considerably short of some of the sanguine estimates that are now indulged in, and this is the greatly increased cost of rails, rolling stock and materials generally, to say nothing of the experience of investors in railroad securities who were caught in the crash of 1873.

## INTERCHANGEABLE BOLTS AND NUTS.

The discussion of this subject at the December meeting of the car-builders has been published in full, and although no definite action was taken looking to a practical plan for securing greater uniformity in the sizes of screws, the discussion revealed very clearly the nature of the difficulty in the way of such a result. The trouble is not wholly because the roads have failed to make use of the Sellers system of screw-threads. This system is doubtless the best in the world as respects the form of threads, but unless it is adhered to in practice with the utmost precision, and according to original standards of measurement, bolts and nuts will

not be interchangeable to the extent that is desired.

So long as some roads make their own taps and dies or purchase them from different manufacturers, although they may nominally conform to one standard, there will be variation sufficient to prevent a perfect interchange, and this for the want of a standard that is really original, or in other words, a standard of standards. If a necessity existed that the yard-sticks of all retail drygoods dealers should be exactly the same length, to the smallest infinitesimal fraction of an inch, great trouble would be experienced in making them so, because there would be no original standard accessible at all times to all dealers. In the matter of bolts and nuts on railway cars, there is such a necessity. If taps and dies were all made by one, or even by a small number of manufacturers, and special pains were taken to have their sizes interchangeable, the present trouble would be very greatly lessened, if not practically done away with. If one standard of measurement were available, there would be no difficulty, but when the measuring is reduced to the fine initial point, it resolves itself, as Mr. Sellers says, into the question as to what is a correct inch or part thereof. So long as tap and die manufacturers and car-builders have standards of their own with which to test the standards of each other, there will be confusion and bad work.

It is evident that there is but one course to pursue in order to attain what is desired. The roads must adhere to one system of threads, and get their taps and dies from one or a certain number of makers, and these makers must agree among themselves upon a standard of measurement and work by it. Each road should provide itself with a sufficient number of the standard gauges used by manufacturers, and test with them all taps and dies purchased. This might not be a complete remedy, but it would greatly diminish the evils now existing. Nothing can be accomplished without some effective cooperation among the roads and manufacturers, and it is to be hoped the matter will not be allowed to rest where it is.

#### THE LIGHTING OF PASSENGER CARS.

The season of short days is a potent reminder that a great many passenger cars are very poorly lighted. It must at the same time be admitted that some are well lighted, but these are the exception and not the rule. When the light is so diffused and dim that a person with good eyes can not read ordinary print in any part of the car, and especially near the lamps or burners, it is what people generally call poor lighting, and this is just the kind of light that is found in a vast number of ordinary way-train cars. The trouble does not seem to be so much with the illuminating material or method, as with the small number of lights to a car. Lard, gas or mineral sperm makes an excellent light if only enough of it is consumed to a car and the burners or lamps properly distributed. So can a car be very well lighted with candles, provided a sufficient number are used. But this would increase the expense, and this is the secret of the bad lighting so much complained of in the local trains leaving the great cities in the evening crowded with people who want to read the papers on their way home. Usually these cars have two oil-center-lamps, or four gas jets, which give only a diffused light, barely sufficient to enable one to recognize faces, the conductors always using their lanterns to read the tickets. What is wanted is a light strong enough to read by at a cost that will permit of its being used on all passenger cars, or, in other words, without any material increase of the present expenditure for ordinary lighting. We fear the want cannot be supplied on these conditions unless Mr. Edison

succeeds in dividing and cheapening the electric light so as to meet the requirement. A small dynamo-electric machine might be driven by a belt from the car axle, or it might be placed in the engine cab, and a current supplied by it to the headlight as well as to the cars. Such a light would not only be brilliant, but perfectly safe, and it may become available sooner than some of us expect. There are some railroad men who say that cars are merely for carrying passengers from place to place, and that it is unreasonable to expect them to be lighted up in the night-time like a drawing-room; and it is alleged, moreover, that the rates of fare are too low, especially to commuters, to justify any additional outlay for lighting to enable people to read newspapers for a half hour, or even an hour, on their way home on winter evenings. That there is some force in these suggestions, cannot well be denied, but still, if it is possible to have a better illumination at even a small increase of cost, by all means let it be introduced upon all passenger cars, and not upon a few exceptional ones on through trains.

#### Complimentary.

[From the Railway World.]

The January number of the NATIONAL CAR-BUILDER comes to us with a new dress and under a new management, Mr. R. M. Van Arsdale, who has been long and favorably known by his business connection with the *Railroad Gazette*, having become the publisher. Various improvements have already been made in the general character of this useful and attractive publication, and others are promised, which will doubtless increase its popularity and value.

[From the Railroad Gazette.]

The NATIONAL CAR-BUILDER, well known to railroad men for many years, has become the property of Mr. R. M. Van Arsdale, and the January number appears in a new dress and a new head, which greatly improve its appearance. The CAR-BUILDER is carefully edited by Mr. James Gillet, who remains, and has some peculiar features which make it convenient for reference, aside from the value of its general contents, consisting of lists of master mechanics and master car-builders, superintendents and purchasing agents.

[From the Railway Age.]

The NATIONAL CAR-BUILDER, of New York, has passed into the hands of Mr. R. M. Van Arsdale, Mr. James Gillet continuing in charge of the editorial department. Mr. Gillet has made the CAR-BUILDER an exceedingly readable and instructive publication, and under its new owner it will continue to grow. Its January issue, commencing the eleventh volume, is bright and attractive in new type and cover. It is a very able and readable journal, filling an important field of railway work not otherwise specially occupied, and deserves the success which it has achieved.

[From the Railway Review.]

Mr. R. M. Van Arsdale has purchased the NATIONAL CAR-BUILDER, of New York. It begins the year with a new dress, including a neat and appropriate heading. Many improvements are promised, and everybody will wish him success. Mr. James Gillet is retained in the editorial chair, which he has filled long and well.

[From the Chicago Tribune.]

The NATIONAL CAR-BUILDER, of New York, has passed into the hands of Mr. R. M. Van Arsdale, and enters upon its eleventh volume with a new dress and an elegant heading. The editorial management is still intrusted to James Gillet, a man thoroughly acquainted with the wants and interests of car-builders and furnishers. Mr. Pullman has furnished the January number with drawings illustrative of narrow-gauge sleeping-cars, which he is building for the Denver, South Park & Pacific. The general incredulity concerning the

idea of a good narrow-gauge sleeper has led Mr. Pullman to give a good deal of care to this matter, and the cars turned out are said to be the finest ever made at Detroit. Among the matters of more than ordinary interest in this issue is a specification furnished by the Chicago, Burlington & Quincy, giving a minute description of the standard freight-locomotive built by that corporation. The mystery of the actual cost of a locomotive is revealed to the public eye by a table copied from the shop books at Aurora, giving the details of the locomotive, and the cost of labor on each detail, successively at the blacksmith, machine, boiler, carpenter, copper and tin shops. The material used brings the actual cost of construction up to about \$6,000, a figure far below the popular notion of the first value of the iron horse.

[From the American Machinist.]

The January number of the NATIONAL CAR-BUILDER comes out with a spick and span new suit of clothes, under its new ownership and management. Mr. R. M. Van Arsdale, widely known in railway circles, has purchased the paper, and will doubtless be able to impart all the energy needed to make the CAR-BUILDER even more popular than it is now among the practical men for whom it is designed. The editorial management remains unchanged.

[From Engineering News.]

With the commencement of the new year the number for January, 1880, of the NATIONAL CAR-BUILDER, of this city, appears promptly upon our table. This Journal, as its name implies, is devoted to the interest of railway rolling stock, and the present issue is No. 1 of Volume XI. Since the December issue it has passed into the hands of Mr. R. M. Van Arsdale, long and favorably known from his business connection with the *Railroad Gazette* of this city, Mr. James Gillet being retained in the position of editor, which he has acceptably filled for a number of years. The CAR-BUILDER has a field not occupied by any other journal, and the new management announces its determination "to make it, as far as possible, a representative journal of the great industry whose name it bears." The present number appears in an entirely new dress, which does great credit to the typographical superiority of its prints, and which, with the excellence of the articles presented, affords an earnest of the truth of the assertions of the new management.

[From the Boston Advertiser.]

The NATIONAL CAR-BUILDER, a monthly, in quarto form, makes a very handsome appearance, and its editorial and news columns are full of interesting and valuable matter. It contains as a unique feature a full and corrected directory of master mechanics, car builders, superintendents, and purchasing agents throughout the United States. It is edited with ability, and presents strong claims for support.

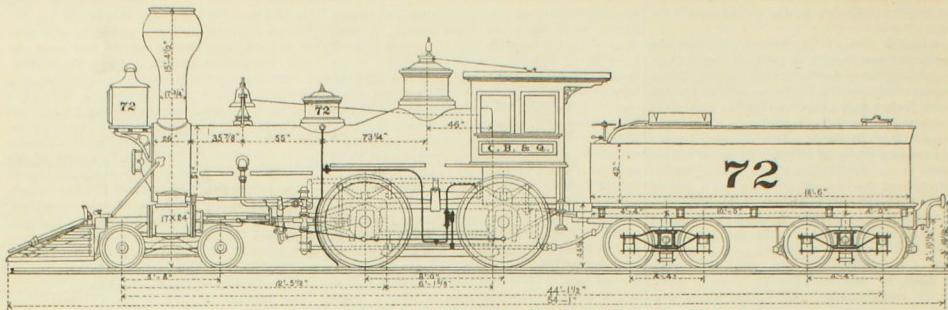
[From the Railreader.]

The NATIONAL CAR-BUILDER begins the new year with a new dress. It is a handsome and valuable journal.

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THE Portland Company, at Portland, Me., is building 75 box and 70 dump cars for the Eastern R. R., and 20 box and 20 platform cars for the Eastern Central.

THE Consolidated Safety-Valve Co., Boston, Mass., is furnishing its valves to the leading railroads of the country; also to the Baldwin, Schenectady, Rhode Island, Hinckley, Taunton, Danforth and other locomotive builders. The company has filed bills against the Crosby Steam Gauge & Valve Co., to restrain it from making the Crosby valve which infringes the patents of the Consolidated Company, the same having been judicially tested, and also sustained by the Eastern R. R. Association.



CHICAGO, BURLINGTON &amp; QUINCY R. R. STANDARD ENGINE, CLASS A.

## Description.

Diam. and stroke of cylinders	17 x 24 in.
driving-wheel spiders—Passenger	57 "
" Freight	57 "
engine truck wheels	28 "
tender	34 "
boiler shell at smoke arch	31 "
and number of flues	105—2
Length of fire box	11 ft. 6 in.
width and height of fire box	60 x 35½ in., 694 cu. in.
main rods	7 ft. 3½ in.
side	8' 0"
engine and tank on rail	10' 3½ in.
" over all	54' 1"
Weight of engine on drivers, in working order	50,000 lbs.
truck	20,000 "

Weight of tank, water and coal 58,000 lbs. 2,750

Capacity of tank in gallons 10 x 13½ in.

Width and length of steam ports 10 x 13½ in.

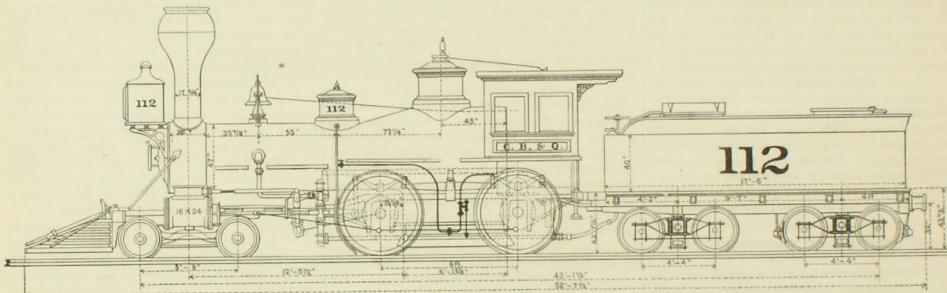
Length of smoke exhaust 56½ in.

Throw of eccentrics 4 ft. 10 in.

Outside and inside lap of valve 4 ft. 10 in.

Length of cylinder rod 13½ in.

Offset of saddle pin

*Note.—R. S. pump plunger 3½ in., L. 8½ in. in. injector. Friedman's improved No. 5, or equivalent. Boiler jacket 1½ in. in. wood, with Wood's planished iron casting and brass band. Dome sand and cylinder valve ¾ in. with check casting of cast iron, also number on back end of tank and on plate in front of engine. Air-brake complete, with Westinghouse air-brake, with attachment of boards faced with 1½ in. brass band polished; also brass boiler cheek casing, with Wood's planished iron panel. Westinghouse air-brake complete, with attachment on tender; air-drum between frames and back of smoke arch.*

CHICAGO, BURLINGTON &amp; QUINCY R. R. STANDARD ENGINE, CLASS B.

## Description.

Diam. and stroke of cylinders	16 x 24 in.
driving-wheel spiders—Freight	53 "
" Passenger	57 "
engine truck wheels	28 "
tender	34 "
boiler shell at smoke arch	31 "
and number of flues	104—2
Length of fire box	11 ft. 6½ in.
width and height of fire box	50 x 35½ in., 694 cu. in.
main rods	7 ft. 3½ in.
side	8' 0"
engine and tank on rail	10' 3½ in.
" over all	53 ft. 7½ in.
Weight of engine on drivers, in working order	45,000 lbs.
truck	25,000 "

Weight of tank, water and coal 52,000 lbs. 2,400

Capacity of tank in gallons 10 x 13 in.

Width and length of steam ports 10 x 13 in.

Length of smoke exhaust 56½ in.

Throw of eccentrics 4 ft. 10 in.

Outside and inside lap of valve 4 ft. 10 in.

Length of cylinder rod 13½ in.

Offset of saddle pin

*Note.—Pump plungers, 2½ in. diameter. Friedman's Injector improved No. 5, or its equivalent. Boiler jacket 1½ in. wood, with Wood's planished iron casting and brass band. Dome sand and cylinder valve ¾ in. with check casting of cast iron, also number on back end of tank and on plate in front of engine. Air-brake complete, with Westinghouse air-brake, with attachment of boards faced with 1½ in. brass band polished; also brass boiler cheek casing, with Wood's planished iron panel. Westinghouse air-brake complete, with air-drum to be between the frames and back of smoke arch.*

We publish herewith drawings and descriptions of standard engines, Classes A, B, E and F, of the Chicago, Burlington & Quincy Railroad. Our last issue contained detailed specifications of Class A, and also a statement of the cost in detail of one engine of this class.

## The Block and Interlocking System of Signals.

The report of the Massachusetts Railroad Commissioners for the past year has just been published. Upon the subject of railroad signals it says:

"There can be no doubt that, for security from rear collisions, and from accidents occurring by reason of misplaced switches, or open draw-bridges, the block system, carried out by interlocking switches and signals, comes nearer to insuring immunity from accident than any other known device. The block system, long used in England, and now brought almost to perfection by in-

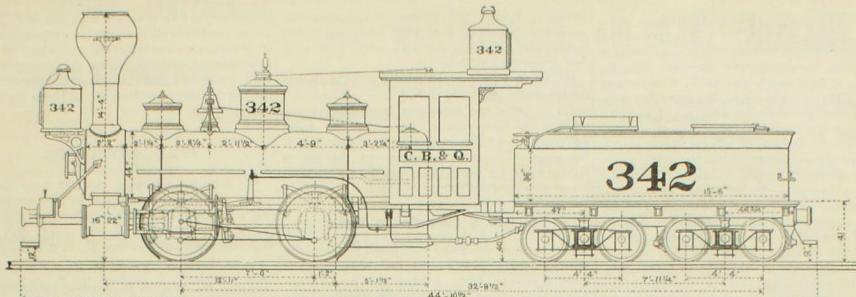
terlocking devices, is so called because under it each section of road is blocked by signals against the entrance of a train, while the section is occupied by another train. Improving on the former system, which only provided for an interval of time between successive trains, the block system secures an interval of space under it, so that it was divided into electric sections.

Before a train could start from the first station a signal was sent from the first to the second, and a favorable reply was given; then a signal was made for the second station, and so on, till the signal from the last station was received. The signal was acknowledged and the section was 'blocked' by a signal showing that it was occupied. When the train reached station two, the signal was sent to occupy that section, and the signal was taken off. Of course if the train met with an accident, or if it was delayed in reaching the second station, the section continued to be blocked, and no other train entered it until the signal from the second station gave notice that the damage had ceased. And the same precautions guard every section throughout the line.

"The interlocking of switches and signals, combined with the block system, not only secures each section from the entrance of a train while it is already occu-

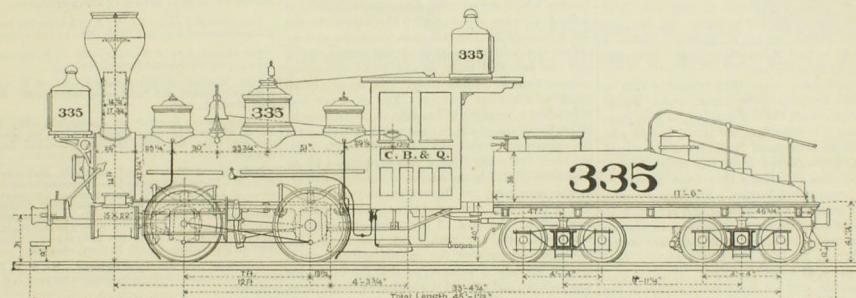
pied, but also blocks the section for any train while the track is broken by the throwing of a switch, or by the opening of a drawbridge, thus removing these causes of numerous disasters, while it allows a vast increase in the number of trains.

"The system, in brief, is by the use of levers, operating switches and signals, so interlocked that a signal of safety cannot be given while danger exists, and danger cannot exist until after it has been signalled. In other words, the operator cannot, by negligence or carelessness, ever accidentally create a situation or suffer it to exist, until he has signalled it afar off, to an approaching train. He cannot open a switch before setting a signal at danger; having opened a switch, he cannot leave it half closed, without giving a signal of danger. All these four errors, each of which has cost many lives, are now impossible, and the result is revolutionized by this system. And the house is not so extravagant that, for this purpose, the working of signals is not trusted to the intelligence, or to the fidelity of a man, but that each man becomes part of an unerring machine, in which his will ceases to operate, and he must act in accordance with the principles of its mechanism.



CHICAGO, BURLINGTON &amp; QUINCY R. R. STANDARD ENGINE, CLASS E.

Description.		Width and length of steam ports.....	12 x 154 in.
Diam. and stroke of cylinder.....	16 x 22 in.	exhaust "	12 x 254 "
driving-wheel spider.....	44 "		5 "
tender truck wheels.....	44 "	Outside and inside lap of valve.....	5&frac12; and 34 "
boiler shell at smoke arch.....	44 "	Length of eccentric rods.....	4 ft. 8&frac12;
" and number of flues.....	135 - 2 " 2 "	Offset of eccentric pin.....	12 ft. 6 "
Length of fire-box.....	11 ft. 10 in.	Throw of valve.....	5 "
with and height of fire-box.....	54 x 3534 in.	Note.—Feed pump on a wrought-iron brace located between the frames, with a	
" main rods.....	7 ft. 6 "	4 ft. 10 in. plunger worked by an eccentric on back driving axle, of 5 in. stroke. Injecting rod, 10 ft. long, with a 10-in. square end, and a 10-in. square base. Copper jacket of 14-gauge, in white wood, with Wood's planished iron casing and iron bands. The dome, sand-box, cylinder, valve chest and check casings, to be of cast iron with sheet-iron panels. The engine to be painted plain black, with numbers and letters in yellow, also number on back end of tank and on number-plate in front of engine.	
of side.....	32 " 8&frac12; "		
of engine and tank on rail.....	44 " 10&frac12; "		
" over all.....	58 ft. 10&frac12; in.		
Weight of engine on drivers in working order.....	40,000 lbs.		
of tank, water and coal (slope-back).....			
Capacity of tank, in gallons.....	1,700		



CHICAGO, BURLINGTON &amp; QUINCY R. R. STANDARD ENGINE, CLASS F.

Description.		Width and length of steam ports.....	12 x 11-16 in.
Diam. and stroke of cylinders.....	15 x 22 in.	exhaust "	12 x 254 "
driving-wheel spider.....	44 "		5 "
tender truck wheels.....	30 "	Outside and inside lap of valve.....	5&frac12; and 34 "
boiler shell at smoke arch.....	4234 "	Length of eccentric rods.....	3 ft. 9&frac12;
" and number of flues.....	66 - 2 "	Offset of saddle pin.....	3 ft. 9&frac12;
Length of fire-box.....	11 ft. 1 in.	Note.—Feed pump has a 3-in. plunger with 22-in. stroke, located under cab for working right side, and is operated by connecting rod from back end of side rod, working a cross-head between top and bottom guides back of pump, said cross-head carrying the pump plunger. A No. 1 Friedmann's injector on its engine, with a 10-in. square end, and a 10-in. square base. Copper jacket of 14-gauge, in white wood, with Wood's planished iron casing and iron bands. Dome, sand-box, cylinder, valve chest and check casings, of cast iron, with sheet-iron panels. Engine painted plain black, letters and numbers in yellow, also number on back end of tank and on plate in front of engine.	
with and height of fire-box.....	4414 x 6314 in.		
main rods.....	2 ft. 0 "		
side.....	0 ft. 0 "		
engine and tank on rail.....	45 " 134 "		
" over all.....	50 ft. 0 in.		
Weight of engine on drivers in working order.....	50,000 lbs.		
of tank, water and coal (slope-back).....			
Capacity of tank in gallons.....	1,700		

"Mr. Barry, in his work on railway appliances, gives a strong instance of the power of a well-made mechanical provision for safety, which we have copied. At Cannon street station, in London, 70 switch and signal levers are placed in one signal house, making millions of combinations possible. If these were not interlocked, or if they could not be controlled, one call would set them all in motion. Yet, under Mr. Barry's blindfolded or blind handling, these levers at random, cannot produce a condition of danger. He could stop trains and hinder business, but he could not create a possibility of danger without it enabling him to do so. Most巧妙的是他能通过这些复杂的信号杆来确保安全，而不是通过它们的物理位置或机械连接。

"In operating this apparatus, two systems of signals are used, one being the action of the lever, the other, and one at a distance sufficient to enable a train to be stopped after the signal is seen, and before entering on the blocked section. The semaphore is used by day for a signal, as being the one distinguishable at a greater distance than any other form. At night colored lights

are used. Mechanical means may be employed for short distances, particularly serving for long distances. To supplement the signal, if it should be obscured by fog or darkness, a "contact bar" is sometimes used, which, with the danger signal, assumes a horizontal position, and, by striking the bar, gives the location of the warning signal, like that given by the bridge-guards, which strike the person who is exposed on a freight car.

"The working of this system for draw-brides is the same as for signals. The draw can be opened until the signal for danger has been set. The danger of safety cannot be removed until the draw has been closed and actually locked.

"By uniting this interlocking device with the block system, it becomes impossible to telegraph safety from one signal station to the station next in the rear, until all the switches are in a safe position for a coming train. It is impossible to move switches so as to allow access from a siding to a track which has been telegraphed as open to a train, unless the draw can be moved while so doing, or by locking it. It is impossible for a train to enter a section until its coming has been announced by telegraph, for the signal to enter cannot be given until a signal announcing its approach has been received.

The signal which permits entrance into a section cannot be given without the concurrence of signal-men at both ends of the section. The starting signal is reset at danger, by machinery behind every train. The signal that the line is blocked must be given from the station in advance to the station in rear.

This summary, in substance, is borrowed from a de-

scription of the combination of the Teacy & Buchanan with the Saxby & Farmer devices, which, aided by the electrical device, was used in the New York portion of the Pennsylvania Railroad and on the Metropolitan Elevated Railroad in New York, as well as elsewhere."

THE Wason Manufacturing Co., at Brightwood (Springfield), Mass., has just completed a new freight-car erecting shop. The shops are building passenger and baggage cars for the Boston, Hoosac Tunnel & Western, the Lake Erie & Western, the Boston & Providence, the St. Louis, Keokuk & Northwestern, the Passumpsic and the Central of New Jersey.

### New Publications.

*Traveler's Official Railway Guide.*—As stated in our last issue, the publication office has been removed to 46 Bond street, New York. The January number, like its predecessors, is a marvel of compactness and completeness with regard to timetables, connections, distances, names of stations, old and new roads, lists of officers, ticket agents, etc. A prominent feature of this number is a new tinted map, 42×27 inches, embracing the entire railroad system of the United States, Canada and Mexico. Its accuracy and clearness of detail make it very valuable for reference. It will not be issued monthly as heretofore, but at longer intervals, to avoid encumbering the book with its bulk. The plate will be subjected to future revision, and any errors that may be discovered fully corrected. The subscription price of the "Guide" is \$4 per year.

*The Practical American.*—This is a new illustrated mechanical journal, issued monthly, and specially devoted to engineering, manufacturing and building. Its editor and proprietor is P. H. Vander Weyde, M. D., who has for many years been the editor of the "Manufacturer and Builder." The initial number has 16 pages, exclusive of advertisements, is well printed, and contains a variety of interesting articles pertaining to its specialty. Dr. Vander Weyde's scientific attainments and large experience in this branch of journalism, can hardly fail to insure for his new journal the support which it deserves. Office of publication, 34 Park Row, New York. Subscription price, \$1.50 per year.

*The Blacksmith and Wheelwright.*—This is another new monthly publication, which makes its appearance with the beginning of the new year. Its specialty is indicated by its title. It will aim to promote the interests of blacksmiths and wheelwrights as distinguished from the large carriage-builders—a class of artisans that have heretofore had no representative journal. The January number is well printed and illustrated, and is filled with original and selected matter pertaining to the industries named. Published at 80 Beekman street, New York; A. M. Richardson, proprietor. Subscription price, \$1 a year.

*The Builder and Wood-Worker.*—This is the consolidated name of the "American Builder" and "Illustrated Wood-Worker," the two publications having been merged into one. In its new form, no less than the old, it is a journal deserving of high appreciation among architects and builders. Price, \$1.50 a year. Charles D. Lakey, publisher, 176 Broadway, New York.

*Car-Builders' Dictionary.*—This long-expected work has at last been published, and an excellent one it is. A copy was received too late for a suitable notice in our present issue.

### Car-Builders' Monthly Meeting.

The January meeting was but slightly attended, owing to a heavy storm which prevailed on the evening of the 22d. The subjects previously announced were car-lighting, ventilating and heating. Mr. Forney read a communication from Mr. J. M. Foster, of Philadelphia, patentee of the Foster compressed gas apparatus for railway cars, and other structures, claiming that by this method cars can be lighted much cheaper than with oil or candles, and with far greater brilliancy, the estimated cost for one car being at the rate of  $\frac{3}{4}$  of a cent per hour for a light equal to 70 candles. It is also represented to be absolutely safe under all circumstances. As an illustration of its extraordinary cheapness, the patentee asserts that a certain prominent railroad (understood to be the Pennsylvania) consumes in its shops, depots and

offices at Jersey City, 300,000 cubic feet of city gas per month, at a cost of \$750, while the Foster compressed gas would furnish a better light at a cost of less than \$75 a month.

Mr. W. G. Cremer exhibited a very handsome double-center car lamp, with the globes far enough apart to bring the light over the heads of passengers on each side of the aisle, and hung sufficiently low to be reached without standing on the seats. The great objection to the use of ordinary gas for car lighting was, in his opinion, the expense and liability to explode.

### The Que & Field Freight Brake.

The merits of this brake were brought before the Car-Builders' Association at the Niagara Falls meeting in June, 1878. At that time, it was in use to a limited extent on the Boston & Maine and Old Colony roads, with very favorable results according to the current reports. Like many other brakes that have been devised for freight trains, its power is derived from the momentum of the train independently of steam or air pressure. The apparatus consists of a spool placed upon one axle of a car or engine, as the case may be, having two movable flanges and movable clutch collars. These clutches and flanges are operated by a yoke and set of clutch levers suspended from the body of the car by means of a lever and toggle joints. The flanges, which are secured in position by means of a feather or key, revolve with the axle while the car is in motion. The collars in which the axle revolves are held in position by the clutch levers, and are provided with oil and waste chambers, making them self-lubricating. The spool is lubricated in a similar manner. The spool revolves only when a pressure is brought to bear upon the levers by means of the flanges and clutch bars. On the upper part of the yoke is a double toggle joint, the lever extending from which is operated by an appliance located in the engine or conductor's car, as the case may be. In the engine, underneath the footboard, is suspended a rock-shaft, which is operated by the foot of the engineer, when he wishes to apply the brakes. A lever is used for the same purpose on the conductor's car, and is located opposite a window, so that the conductor can look out and control the brakes by the lever at the same time. The pressure of the clutch is released by a spring attached to the lever. The advantages claimed for the brake are that it can be used in connection with the ordinary hand-brake, and is not liable to get out of repair. It is under the control of the engineer at the forward end of the train, and of the conductor at the rear end, and as much power can be applied for the stoppage of trains as by the vacuum air-brake. The simultaneous application of the braking power at the front and rear ends of the train affords a push-back and pull-back force which saves the cars from the pounding to which they would be subjected if the power was applied only at the forward end. The cost of equipment is said to average about \$10 per car, which includes the fittings on the engine and caboose. The objection on the score of mixed trains of interchanged cars is obviated by applying the brake to a few cars only at the front and rear of trains, the foreign cars not equipped with it being placed intermediately.

We shall, in a future number of the CAR-BUILDER, give full illustrations and a more detailed description of this brake.

The works of the Allegheny Car & Transportation Company, at Swissville, Pa., have been sold and are to be started up soon.

The Danforth Locomotive Works, at Paterson, N. J., have a number of orders on hand and are very busy.

A MASTER CAR-BUILDER who has had twenty years practical experience in the various branches of construction and repairing, and who now holds a permanent position on an old and prominent road, desires to make a new engagement. Can furnish the best of references. Address NATIONAL CAR-BUILDER, New York.

### Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

*Burlington & Lamoille.*—Mr. N. H. Leach has been appointed Superintendent, vice Mr. D. C. Lindsey.

*Canada Southern.*—Mr. E. P. Murray is appointed Superintendent U. S. Division, vice M. D. Woodford, resigned. Mr. Wm. E. Carroll is appointed Superintendent of Canada Division.

*Central of Minnesota.*—This road has been consolidated with the Southern Minnesota, and is now known as the Mankato Division.

*Central Branch, Union Pacific.*—This road will hereafter be known as the Central Branch Division of the Missouri Pacific. A. A. Talmage is General Superintendent, W. W. Fagan, Division Superintendent, and H. V. Fairies, Master Mechanic.

*Charlotte, Columbia & Augusta.*—Mr. Jno. G. Clarke has been appointed Superintendent, vice T. D. Kline.

*Chicago, Burlington & Quincy.*—Mr. H. B. Stone has been appointed Superintendent of Motive Power and Machinery, in place of Geo. Chalender resigned.

*Columbus & Rome.*—Mr. T. J. Nuckolls has been appointed General Manager, with office at Columbus, Ga.

*Des Moines, Adel & Western.*—Mr. C. N. Gilmore has been appointed General Superintendent.

*Fort Madison & Northwestern.*—Mr. S. B. Kemprick is Superintendent and Purchasing Agent, with office at Fort Madison, Iowa.

*Indianapolis, Decatur & Springfield.*—Mr. H. S. Moore, formerly Division Superintendent on the Ballimore & Ohio, has been appointed General Superintendent.

*Lake Erie & Western, and Lafayette, Bloomington & Muncey.*—These roads have been consolidated under the name of Lake Erie & Western Railway Company. E. W. Waldron is General Manager. George H. Smith Superintendent of Eastern Division, D. S. Hill Superintendent of Western Division, and E. S. Andress Purchasing Agent. Mr. H. L. Cooper has been appointed Superintendent of Equipment, vice C. E. Gore, resigned.

*Louisville, New Albany & Chicago.*—Mr. S. M. Brown has been appointed Superintendent, in place of J. S. Day, resigned.

*New York, Lake Erie & Western.*—Mr. Thomas West, heretofore Foreman of Susquehanna shops, has been appointed Master Mechanic of Buffalo shops, in place of F. M. Wilder, promoted to Superintendent of Motive Power and Machinery, at Susquehanna.

*New York & New England.*—Mr. George E. Boyden, Master Mechanic of Eastern Division, has been appointed Superintendent of Motive Power for the entire line.

*Ontario Southern.*—The name of this road has been changed to Lake Ontario Southern, and the Geneva, Hornellsville & Pine Creek road has been consolidated with it.

*Pensacola & Selma.*—Mr. W. H. Wells has been appointed Engineer, in place of John T. Milner, resigned. Mr. Wells was recently on the Marietta & North Georgia road.

*Peru, Peoria & Evansville.*—Mr. Isaac Adams has been appointed Master Mechanic, vice E. Clemens, resigned.

*Peru, Peoria & Jacksonville.*—Mr. Geo. H. Skinner has been appointed General Manager for the purchaser, under the recent sale.

*St. Louis, Hannibal & Keokuk.*—Mr. W. W. Walker has been appointed Superintendent, with office in Hannibal, Mo., in place of E. M. Green, resigned.

*Springfield, Jackson & Pomeroy.*—The name of this road has been changed to Springfield Southern.

*Terre Haute & Logansport.*—This road has passed under the control of the Terre Haute & Indianapolis road (Vandalia line.)

*Toledo, Delphos & Burlington.*—Mr. Geo. H. Tier has been appointed Master Mechanic, vice E. Williams.

*Vicksburg, Shreveport & Texas.*—The name of this road has been changed to Vicksburg, Shreveport & Pacific.

*Wabash, St. Louis & Pacific.*—Mr. Henry F. Clark has been appointed Superintendent of the Illinois Division, in place of C. H. Chappell, resigned.

## THIRTY-SECOND SEMI-ANNUAL

## STATEMENT

OF THE

TRAVELERS  
INSURANCE CO.

HARTFORD, CONN., JANUARY 1, 1880.

## ASSETS.

Real estate	\$735,851.87
Cash on hand and in bank	353,855.01
Loans on land and mortgages, real estate	2,012,438.80
Interest on loans, accrued but not due	31,015.37
Loans on collateral security	3,200.00
Deferred Premiums	46,129.41
Premiums due and unreported on Life policies	34,129.41
United States Government bonds	277,150.00
State, county and municipal bonds	345,000.00
Balances in stock market	400,350.00
Bank stocks	607,032.50
Hartford City Gas-Light Co. stock	18,000.00
Adams Express Co. stock	52,000.00
Total assets	<b>\$8,955,990.42</b>
LIABILITIES.	
Reserve, four per cent., Life Department	\$3,192,438.80
Reserve for re-insurance, Accident Department	268,694.66
Claims unadjusted and not due, and all other liabilities	198,406.00
Total liabilities	<b>\$8,659,539.46</b>
Surplus as regards policy-holders	<b>\$1,296,450.96</b>

## STATISTICS FOR THE YEAR 1879.

## LIFE DEPARTMENT.

Number of Life Policies written in 1879	1,711
Whole number of Life Policies in force	11,352
Amount Life Insurance in force	\$18,182,132.00
Total claims paid in Life Department	\$1,395,517.92
ACIDENT DEPARTMENT.	
Number of Accident Policies written in 1879	54,540
Cash premiums received for same	\$899,240.90
Gain in policies over 1878	11,122
Gain in premiums over 1878	\$21,645.39
Whole number of Accident Policies written in 1879	57,552
Number of Accident Claims paid in 1879	57,552
Amount Accident Claims paid in 1879	\$395,678.36
Whole number Accident Claims paid	41,594
Whole amount Accident Claims paid	\$3,137,630.24
Total Losses paid both Departments	\$4,833,118.16

JAS. G. BATTERSON, President.

G. F. DAVIS, Vice-President.

RODNEY DENNIS, Secretary.

JOHN E. MORRIS, Assistant Secretary.

GEORGE ELLIS, Actuary.

EDWARD V. PRESTON, Supt. of Agencies.

G. P. DAVIS, M. D., Medical Examiner.

J. B. LEWIS, M. D., Surgeon and Adjuster.

NEW YORK OFFICE,  
Tribune Building.

R. M. JOHNSON, Manager.

GEORGE WESTINGHOUSE, JR.,  
PRESIDENT.  
RALPH BAUGALEY,  
SECY. AND TREASURER.  
T. W. WELSH,  
SUPERINTENDENT.  
**THE WESTINGHOUSE AIR-BRAKE COMPANY,**  
PITTSBURGH, PA., U. S. A.  
MANUFACTURERS OF THE

WESTINGHOUSE AUTOMATIC BRAKE,  
WESTINGHOUSE LOCOMOTIVE DRIVER BRAKE,  
VACUUM BRAKES (Westinghouse & Smith Patents),  
WESTINGHOUSE AIR BRAKE.

Particular attention is called to the "AUTOMATIC" and "LOCOMOTIVE DRIVER BRAKES," now being tested and adopted by the Pennsylvania Railroad.

With the "DRIVER BRAKE" the engineer can handle an ordinary freight train better than with brakemen. The saving in car wheels and wages will therefore be apparent. On shifting or yard engines it is invaluable. The "AUTOMATIC" has proved itself to be the most efficient train and safety brake known. Its application is instantaneous and automatic. It can be applied if desired, shortening the time of stopping a train in case of emergency. It applies automatically. A GUARANTEE is given customers against loss from PATENT SUITS on the apparatus sold them. FULL INFORMATION FURNISHED ON APPLICATION.

**DIAMOND STATE CAR SPRING COMPANY.**  
JAMES P. HAYES,



**The Greatest Bargains Ever Offered in New Car Works Tools.**

The following Tools were bought new in 1873, to fit up the Petersburg Car Works (Virginia), and not having been used a single day, they are now in complete order, and have every accomplishment which comes with them, new from the factory. They will be sold, boxed, and delivered, F. O. B. cars, at the following low rates, which is impossible to beat:

ONE No. 4 Woodbury Planing and Matching Machine.	Price, \$1000
Planes 4 sides, 24 inches wide. Tongues and Grooves.	Factory Price, \$800.
ONE extra heavy Gray & Wood's Planer.	Planes 35 feet long and 24 inches wide. Factory price, \$1200.
ONE Richardson's London & New York's Cross-Graining and Tapering Machine.	30 feet long. Factory \$2000.
ONE No. 2 40-inch Richards, Kelly's Band Saw, with Patent Gauge and Perrin Saw Blade.	Factory Price, \$355.
ONE Gant's Variety Upright Moulding Machine.	Factory price, \$420.
ONE J. A. Fay & Co.'s Vertical Car Tenoning Machine and 2 Extra Heads.	Factory price, \$820.
ONE C. B. Rogers & Co.'s Circular Head Tenoning Machine.	Factory price, \$20.
ONE J. A. Fay & Co.'s Medium Double Head Tenoning Machine, no Copes.	Factory price, \$220.
ONE C. B. Rogers & Co.'s Iron Frame Railway Saw Machine.	Factory Price, \$135.
ONE Automatic Knife Grinding Machine, with Emery Wheel, 22 x 1½ inches.	Factory price, \$135.
ONE Second-hand Car-Wheel Boring Machine.	Factory price, \$200.
ONE Second-hand Wheel Press.	Factory price, \$200.

Address A. A. ALLEN &amp; CO., Petersburg, Va.

**HOOPES & TOWNSEND,**

1330 BUTTONWOOD STREET,

Philadelphia, Pa.,

MANUFACTURE

**MACHINE, CAR, AND BRIDGE BOLTS,**

# CLARENCE BROOKS & CO.,

MANUFACTURERS OF

RAILWAY AND FINE COACH

# VARNISHES,

Corner of West and West Twelfth Streets,

CLARENCE BROOKS,  
THOS. B. BROOKS.

NEW YORK.

# EAMES VACUUM BRAKE CO., RAILWAY TRAIN BRAKES,

P. O. Box 2878.

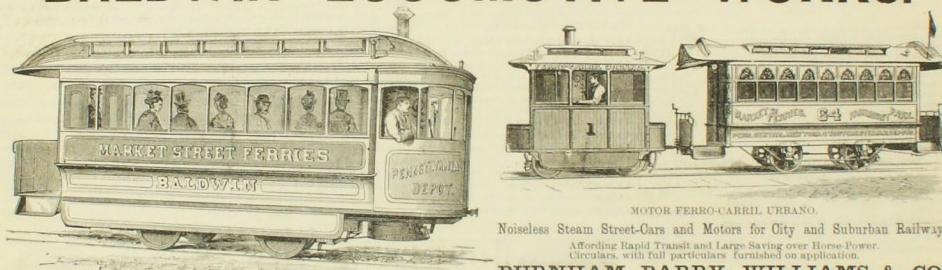
SALES OFFICE, 15 GOLD ST., NEW YORK.

Represented by THOMAS PROSSER & SON

THE EAMES VACUUM BRAKE is confidently offered as the most efficient, simple, durable, and cheapest power Brake in the market.

CAN BE SEEN IN OPERATION UPON OVER FIFTY ROADS.

# BALDWIN LOCOMOTIVE WORKS.



MOTOR FERRO-CARRIL URBANO.  
Noiseless Steam Street-Cars and Motors for City and Suburban Railways  
Affording Rapid Transit and Large Saving over Horse-Power.  
Circumstances, with full particulars furnished on application.

BURNHAM, PARRY, WILLIAMS & CO.,  
PHILADELPHIA, PA.

R. E. RICKER, & CO., New York Agents, 17 Cortlandt Street, New York.

NO MORE HOT BOXES!

# EAGLE CAR-BOX LUBRICATOR CO.

We can give the highest of references, including some of the best roads in the United States. We claim that our compound is a perfect cooler; saves brasses, and trouble and annoyance of frequent greasing. This is abundantly proved by our contin-



ual orders from railway companies, who are deriving the greatest satisfaction from its use.

We sell in quantities of from five barrels to car loads, and no charge is made unless it proves satisfactory.

We also manufacture the EAGLE MACHINERY AND CUP COMPOUND which takes the place of Sperm and Lard Oil. It has been tested in Navy Yards and Engine and Machine Shops. Pamphlets explain further.

Address A. G. MANDEL, General Manager, P. O. Box 2555; Office, 26 Burling Slip,

NEW YORK.

## CHICAGO AXLE AND FORGE CO.,

MANUFACTURERS OF



CAR AND LOCOMOTIVE AXLES, ENGINE AND MILL SHAFTING,  
CHICAGO, ILL.

\*W. H. CUNNINGHAM, General Manager.

### BALL'S PATENT TELESCOPE JACK.

HOT AND COLD PUNCHED NUTS,

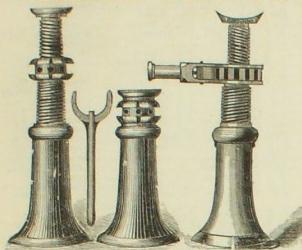
Bolts, Lag Screws, and Washers,  
BELTING.

Packing Hose, Rubber Springs, Car Trimmings,  
STEAM PUMPS.

### ALBERT BRIDGES,

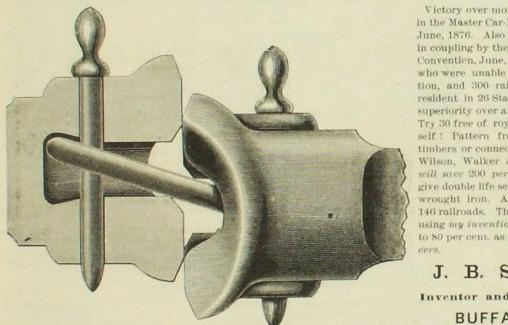
MANUFACTURER OF AND DEALER IN

Railway and Mining Supplies and Machinery,  
NO. 46 CORTLANDT STREET,  
P. O. Box 2843, NEW YORK.



## SAFFORD'S SAFETY DRAW-BAR.

"VICTORY OVER MORE THAN 30 CONTESTANTS."



J. B. SAFFORD,  
Inventor and Sole Proprietor,  
BUFFALO, N. Y.

Victory over more than 30 Self Couplers in the Master Car-Builders' Convention of June, 1877. Also indorsement for safety in coupling by the Yard Masters, in their Convention, June, 1877, and by 300 others who were unable to attend the Convention, and 300 railroad officials who are resident in 20 States, and who admit its superiority. Price \$1.50 per bar. Try 20 free of royalty, and see for yourself! Pattern free, and no change in timbers or connections. Those made by Wilson, Walker & Co., Pittsburgh, Pa., will save 200 per cent. in repairs, and give double life service over old styles of wrought iron. About 43,000 in use on 146 railroads. The saving in repairs by using my invention is from 20 per cent. to 80 per cent. as per report of many officers.

## COBB'S IMPROVED CAR-SEAT SPRINGS.



The Most Perfect Springs in the Market.  
SPECIFY THEM IN YOUR ORDER.

H. B. COBB & CO., Wilmington, Del.  
Send for Sample Seat and PRICE LIST.

## COOPER ELASTIC STEEL WHEEL COMPANY

Desires to call the attention of Railway Officials to this NOVEL, and important invention, which combines Simplicity, Durability, Safety, and Economy.



The Cooper Elastic Steel Wheel Company, Cambridgeport, Mass.

Requires no bolts or nuts. Also, Chilled Car-Wheels, Axles, and Wheels, fitted complete for Car Builders.

Important to Railroad Managers and Master Mechanics.

## SIBLEY'S

### Perfection Valve Oil.

More perfect lubrication insured, and entire freedom guaranteed from corrosion of cylinders and destruction of steam joints by fatty acids.

In exclusive use on 30 railroads.

References and prices furnished upon application.

Makes exclusive specialty of the Manufacture of Valve and Signal Oils for Railroad Cars.

## SIGNAL OIL WORKS,

FRANKLIN, PA.

J. C. SIBLEY, Manager.

THE OLDEST HOUSE, ESTABLISHED 1814

### WOOD-WORKING

### MACHINERY

For Every Description of Work.

CAR MACHINERY A SPECIALTY.

Latest Improved and Best in Use.

MANUFACTURED BY

C. B. ROGERS &amp; CO.

MANUFACTORY: NORWICH, CONN.

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## SCHLENKER'S

Stationary-Die and Revolving-Die

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THE BEST AND CHEAPEST MADE.

HOWARD IRON WORKS,  
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Send for Catalogue.

### HYDRAULIC

### Jacks and Punches,

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Raising Heavy Weights,  
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On hand and made to order.

Second-Hand Hydraulic Presses bought

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Machinery for Polishing and Buffing Metals. Send for Circular.

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## JOURNAL BEARINGS,

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MENEELY'S  
PATENT BELL-METAL ENDED  
Journal Bearings,

FOR REDUCING LATERAL WEAR.

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WEST TROY, N. Y.

FEBRUARY, 1880.

Directory of Master-Mechanics and Master Car-Builders  
THROUGHOUT THE UNITED STATES AND CANADA.

**REFERENCES.** — <sup>1</sup>Mechanical Engineer. <sup>2</sup>Mechanical Superintendent. <sup>3</sup>General Master-Mechanic. <sup>4</sup>Gen. Master Car-Buildler. <sup>5</sup>Master of Machinery. <sup>6</sup>General Foreman. <sup>7</sup>Superintendent of Machinery. <sup>8</sup>Superintendent of Motive Power and Machinery. <sup>9</sup>Superintendent of Rolling Stock. <sup>10</sup>Supt. Cars and Buildings.

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Railroad	Master Mechanic	Master Car Builder	Residence	Railroad	Master Mechanic	Master Car Builder	Residence
Texas & Pacific	A. J. Prescott	H. L. Clark	Logansport, Ind.	Vicksburg, Shreveport & Pacific	C. H. Tull	I. N. Fording	Monroe, La.
Texas & Pacific	H. J. Small	F. M. Alexander	Houston, Texas.	Virginia & Truckee	W. C. Wills	J. H. Kester	Carson, Nev.
Tiggo & Elmer Stock Line	Pete Bonny	D. H. Stratton	Blossburg, Pa.	Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Fort Wayne, Ind.
Toledo, Peoria & Western	Geo. F. Pier	R. M. Hemphill	Delphos, O.	Wabash, St. Louis & Pacific	J. A. E. Weddey	J. H. Koer	Lake City, Fla.
Toledo, Peoria & Warsaw	David Preston	J. Haggas	Toronto, Can.	Wabash, St. Louis & Pacific	John Wills	J. T. Nalls	Springfield, Ill.
Toronto, Grey & Bruce	Z. B. Davis	R. V. Coon	Toronto, Can.	Wallkill Valley	John Moyer	John Harrison	Toledo, Ohio.
Toronto & Nipissing			Troy, N. Y.	Wash. City, Va. Mid. & G. South	John Flynn	Nathan Pawling	Rosemont, Ill.
Troy & Boston				Western North Carolina	D. D. Williams	W. G. Grumbard	Alexandria, Va.
Union Pacific	G. H. Congdon	Geo. E. Stevens	Omaha, Neb.	Western N. Carolina	Geo. W. Gates	J. H. Nusser	Philadelphia, Pa.
Eastern Division	A. M. Collett	John M. Baker	Omaha, Neb.	Western N. Carolina	Robert King	F. M. Wade	Atlanta, Ga.
Eastern Division	T. A. Davis	Floyd Heaveren	Laramie, Wyo.	Western N. Carolina	Isaac W. Clark	Isaac W. Clark	Salt Lake City, Md.
Mountain Division		R. V. Brinkley	Evanston, Wyo.	Western Union	E. E. Eddy	E. E. Eddy	Montgomery, Ala.
Laramie Division		E. G. Thomas	St. Louis, Mo.	Western Maryland	J. A. Tilford	Wm. McKelvey	Payette, N. C.
Western Division	James S. Scott	Sam. S. Tucker	Salt Lake City	Western Maryland	W. L. Wingerd	C. C. Williams	Roxbury, Miss.
Colorado Division	H. M. Smith	Sam. D. James	Utica, N. Y.	Western Maryland	John Bissell	W. H. Day	Wadsworth, N. J.
Union Railway & Transit Co.	H. M. Armstrong	F. W. Magargh	Brewsterport, N. Y.	Wilmingtn. & Welden	J. H. Adams	J. R. Lowe	Hartford, Conn.
Utah & Colorado	John Bissell			Wisconsin Central	G. Campbell	John G. Brady	Florence, S. C.
Utica & Black River	Lon F. McAleer			Worcester & Nashua			Wilmington, N. C.
Utica, Ithaca & Elmira							Worcester, Mass.
Vicksburg & Meridian	Jas. B. Browne						
Vicksburg, Miss.							
Directory of Railway Superintendents and Purchasing Agents THROUGHOUT THE UNITED STATES AND CANADA.							
REFERRENCES.—General Manager. * Managing Director. † Assistant General Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.							
A							
Adirondack	Superintendent	Purchasing Agent	Residence	Railroad	Superintendent	Purchasing Agent	Residence
Adirondack	C. M. Bridges	Chas. P. Ball	Saratoga, N. Y.	Chesapeake & Lenawee	R. Stewart	H. H. Stone	Keene, N. H.
Alabama Central		Chas. P. Ball	Chattanooga, Tenn.	Chicago & Northwestern	Moses B. Hinman	J. M. Mason	Chester, S. C.
Alabama Great Southern		Chas. P. Ball	Honesdale, Pa.	Chicago & Northwestern	John C. Wheeler	John C. Wheeler	Chicago, Ill.
Alaska		Geo. Young	John L. Awi	Wisconsin & Mich. Div.	E. C. Cuyler	E. C. Cuyler	Chicago, Ill.
Alleghany Valley		David M. Gregg	Anderson, Ind.	Kankakee & Calumet	W. B. Lindsey	J. H. Bates	Escanaba, Mich.
Anderson, Lebanon & St. Louis	Jas. A. Larned		Anderson, Ind.	Madison Division	J. H. Bates	J. H. Bates	Madison, Wis.
Arkansas & Missouri	A. M. Johnson		Hebron, Ark.	Galeana Division	John Bissell	John Murray	Chicago, Ill.
Atchison, Topeka & Pottawatomie	B. M. Scott		Topeka, Kan.	Illinoian & Michigan Division	J. H. Oliver	J. H. Oliver	Clinton, Iowa.
Atchison, Topeka & Santa Fe	W. B. Strong	F. M. Smith	Nickerson, Kan.	Winona & St. Peter Division	J. C. McMullen	A. V. Hartwell	Waukegan, Ill.
Western Division	Geo. B. Lake		Atchison, Kan.	Chicago & Alton	J. C. McMullen	J. C. McMullen	Chicago, Ill.
Atchison & Nebraska	L. W. Towne		Kansas City, Mo.	Chicago & Alton	J. C. Chappell	J. C. Chappell	Bloomington, Ill.
Atchison & Nebraska	* G. H. Netterton	G. W. P. Atkinson	Atlanta, Ga.	St. Louis Division	W. H. Stager	W. H. Stager	Alton, Ill.
Atchison, Topeka & Pottawatomie	L. P. Grant		Newbern, N. C.	Jacksonville Division	H. W. Stager	H. W. Stager	Roodhouse, Ill.
Atlantic & West Point	Jas. Hughes, Pres.		Cleveland, O.	Kankakee & Calumet	J. H. Holcomb	J. H. Holcomb	Kansas City, Mo.
Atlantic & North Carolina	P. D. Cooper		Bellefonte, Pa.	Chicago & Block Coal	J. H. Murray	J. H. Murray	Terre Haute, Ind.
Atlantic & North Carolina			Bellwood, Pa.	Chicago, Burlington & Quincy	John F. Beach	John F. Beach	Chicago, Ill.
Atlantic & Great Western	A. L. Dunbar	J. H. Holcomb	Bellwood, Pa.	Chicago, Burlington & Quincy	Thos. J. Potter	Wm. Irving	Waukegan, Ill.
First & Second Divisions	T. A. Phillips		Bellfonte, Pa.	Chicago, Burlington & Quincy	J. H. Murray	George Alexander	Galesburg, Ill.
The Rock Island Divisions	J. M. Ferris	J. P. Minetree	Galloway, O.	Chicago, Burlington & Quincy	H. Hitchcock	C. L. Rising	Galesburg, Ill.
Mahoning Division			Meadville, Pa.	Chicago, Burlington & Quincy	F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Atlantic, Mississippi & Ohio	J. J. Gormley		Petersburg, Va.	Chicago, Rock Island & Pacific	O. S. Jackson	O. S. Jackson	Des Moines, Iowa.
Atlantic, Tennessee & Ohio			Charlotte, N. C.	Chicago, Rock Island & Pacific	J. C. Clarke	J. C. Clarke	Keokuk, Ia.
Baltimore & Ohio	** W. M. Clements, N. S. Hill		Baltimore, Md.	Iowa Division	A. Manvel	A. Manvel	McComb City, Miss.
Ohio & Chicago Division	C. H. Hindman		Chicago, Ill.	Kookoo & Des Moines	A. Manvel	A. Manvel	Davenport, Iowa.
Hinsdale & Western	K. H. Hindman		Connellsville, Pa.	Chicago, Rock Island & Pacific	H. R. Rose	H. R. Rose	Des Moines, Iowa.
Baltimore & Potomac	Geo. Wilkins		Bangor, Me.	Iowa Division	K. H. Kimball	K. H. Kimball	Keokuk, Ia.
Bangor & Piscataqua	Arthur Brown		Banham's Bay, N. Y.	Knoxville Division	W. M. Lawler	W. M. Lawler	Menomonie, Mich.
Bath & Hammondsport	G. F. Sanders		Bellefonte, Pa.	Chicago & Eastern Illinois	W. C. Van Horne	W. C. Van Horne	Milwaukee, Wis.
Bedford, Newry, Owego & B'd	B. H. Hurley		Bellfonte, Pa.	Chicago & Northeastern	J. H. Holcomb	J. H. Holcomb	St. Joseph, Mich.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellwood, Pa.	Chicago, Pekin & St. Paul	J. Murray	J. Murray	Racine, Wis.
Bell's Gap	Robert G. Ford		Bellwood, Pa.	Chicago, Pekin & St. Paul	E. W. Winter	E. W. Winter	Hudson, Wis.
Benton & Rutland	J. D. Vail		Bellwood, Pa.	Chicago, Pekin & St. Paul	Gen. C. Kimball	Gen. C. Kimball	Muskegon, Mich.
Blairstown			Bellwood, Pa.	Chicago, Rock Island & Pacific	L. H. Stahr	L. H. Stahr	Batavia, O.
Boston, Boston Beach & Lynn	E. H. Whorf		Bellwood, Pa.	Iowa Division	George H. Wilber	George H. Wilber	Elkhart, Ind.
Boston & Albany			Bellwood, Pa.	Knoxville Division	Frank K. Hinman	Frank K. Hinman	Rock Port, Ind.
Boston & Albany	C. O. Russell		Bellwood, Pa.	Chicago & Milwaukee	Gen. C. Kimball	Gen. C. Kimball	Terre Haute, Ind.
Boston & Albany Air Line	Joe H. Franklin		Bellwood, Pa.	Chicago & Milwaukee	H. Park	H. Park	Cincinnati, O.
Boston & Providence	A. A. Folson	A. A. Folson	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	G. L. Jackson	G. L. Jackson	Cincinnati, O.
Boston, Concord & Montreal	E. B. Burnham		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. H. Murray	J. H. Murray	Columbus, O.
Boston, Hoosac Tunnel & Western	M. E. Wool		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. L. Rising	C. L. Rising	Sandusky, O.
Boston, Worcester & Fitchburg	F. H. Nourse		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	D. W. C. Brown	D. W. C. Brown	Cincinnati, O.
Boston, Worcester & Fitchburg	H. M. Witter		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	Chas. Howard	Chas. Howard	Concord, N. H.
Boston, Worcester & Fitchburg			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	E. B. Thomas	E. B. Thomas	Indianapolis, Ind.
Buffalo & Western			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. C. Gale	C. C. Gale	Cleveland, O.
Buffalo, New York & Philadelphia	Geo. S. Gatchell		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	John Thomas	John Thomas	Elkhart, Ind.
Cairo & St. Louis	L. M. Johnson		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. D. Layng	Wm. Mullins	Pittsburgh, Pa.
Calif. & Vicineens	Roswell Miller		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	S. G. Jones	S. G. Jones	Mt. Vernon, O.
California Pacific & Northern	J. J. Fillmore		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	John Mulligan	John Mulligan	Springfield, Mass.
Canada Central			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	Samuel Babcock	Samuel Babcock	Hartford, Conn.
Canada Southern	T. A. McKinnon		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. F. Jones	J. F. Jones	Lynnville, Vt.
Centralia Division	Wm. P. Taylor		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	A. H. Gorton	A. H. Gorton	Columbus, O.
Canada Division	Z. E. Carroll		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. L. Boggs	O. N. Lall	Sioux City, Iowa.
Toledo Division	R. J. Cavett		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	P. L. Burwell	P. L. Burwell	Chambersburg, Pa.
Caribou & Wausau	V. Q. Chapman	C. W. Chapman	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	L. H. Dowdney	L. H. Dowdney	Port Norris, N. Y.
Carolina Central			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	L. W. Sandford	L. W. Sandford	South Norwalk, Ct.
Catasauqua & Fogelsville			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	James Eads	James Eads	Parc, Ill.
Cayuga & Susquehanna			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. O. Arnold	J. O. Arnold	Dayton, O.
Cazenovia, Canastota & De Ruyter	John Stebbins		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	H. E. Chamberlin	H. E. Chamberlin	Dayton, O.
Central Pacific	* A. N. Towne		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	D. D. Warren, Pres.	D. D. Warren, Pres.	Dayton, O.
Central Pacific	C. Fellows		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	John Mulligan	John Mulligan	Springfield, Mass.
Western & Visalia Divisions	A. D. Wilder	J. R. Watson	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. E. Glimperling, Rec.	J. E. Glimperling, Rec.	Hartford, Conn.
Trinity Division	J. Burdett		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	O. S. Sanford	O. S. Sanford	Lynnville, Vt.
Humboldt Division	F. W. Coddington		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. F. Young	C. F. Young	Columbus, Ga.
Salt Lake Division	G. W. Coddington		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. D. Hammond	C. D. Hammond	Concord, N. H.
Santa Fe & Oregon Div.	A. G. Felt		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	Theo. Vorhees	Theo. Vorhees	Pittsburgh, Pa.
Central Vermont	J. W. Hobart		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. H. Weller	J. H. Weller	Scranton, Pa.
Central Vermont	M. Foss		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	John Mulligan	John Mulligan	Hoboken, N. J.
Western Division	J. W. Hobart		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	R. D. Mulligan	R. D. Mulligan	Dayton, O.
Central & Southern Division	Ambrose Arnold		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. White Sprout	J. White Sprout	Dayton, O.
Rutland Division	J. Burdett		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. D. Hammond	C. D. Hammond	Honesdale, Pa.
North & Southern			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	G. W. B. Cushing	G. W. B. Cushing	Albany, N. Y.
Central of Georgia			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	W. C. Kneissly	W. C. Kneissly	New York City.
Atlanta Division			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. O. Arnold	J. O. Arnold	Scranton, Pa.
Central of New Jersey			Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. H. Weller	J. H. Weller	Hoboken, N. J.
Champaign, Havana & Western	J. W. Pickering		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	John Mulligan	John Mulligan	Dayton, O.
Charlottesville, Staunton & Augusta	A. H. Wood	B. W. Burnett	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	R. D. Mulligan	R. D. Mulligan	Dayton, O.
Chesapeake & Ohio	J. M. Walker		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. White Sprout	J. White Sprout	Easton, Md.
Eastern & Middle Division	M. S. Dunn	J. A. Netherland	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	C. D. Hammond	C. D. Hammond	Wilmington, Del.
Western Division	G. S. Netherland		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	G. W. B. Cushing	G. W. B. Cushing	Denver, Col.
Cheraw & Dahlington	J. Mallory		Bellwood, Pa.	Chicago, Milwaukee & St. Paul	W. C. Kneissly	W. C. Kneissly	Albion, N. Y.
Cherokes & McLane	R. D. Townsend	William McIrae	Bellwood, Pa.	Chicago, Milwaukee & St. Paul	J. H. Weller	J. H. Weller	Dayton, O.

<i>Residence</i>	<i>Superintendent, Purchasing Agent</i>	<i>Residence</i>	<i>Superintendent, Purchasing Agent</i>	<i>Residence</i>
Detroit, Hillsdale & Southwestern	W. F. Parker	Ypsilanti, Mich.	H. E. Packer	Metcalfen, N. J.
Detroit, Lansing & Northern	J. B. Muliken	Detroit, Mich.	A. Mitchell	Wilkesbarre, Pa.
Detroit, Saginaw & Toledo	J. B. Murphy	Detroit, Mich.	C. A. Hall	Quincy, Ill.
Dunkirk, Albany & Pitts.	D. Thayer	Dunkirk, N. Y.	John A. Nelson	Lakeville, Pa.
Dunkirk, Allegheny Val. & Pitts.	C. V. DeForest	New York City	T. H. Hartman	Little Rock, Ark.
East Broad Top.	A. W. Sims	Orchard, Pa.	A. W. Woodson	Lineout, Cal.
East Alabama & Cincinnati	W. W. Barnes	Oppelika, Ala.	L. R. Sharp, Rec.	L'g Island C. S., N. Y.
East Line & Red River	J. W. Barnes	Kosciusko, Miss.	R. M. Galloway	Louisville, Ky.
East Tennessee & Georgia	J. D. O'Brien	Knoxville, Tenn.	D. W. Rowland	Bowling Green, Ky.
Eastern Shore	*D. W. Sanborn	Boston, Mass.	G. C. Breed	Cincinnati, Ky.
Eastern Kentucky	H. W. Thompson	Prince George, Md.	Jas. Montgomery	Nashville, Tenn.
Erie & Pittsburgh	J. M. Kimball	Erie, Pa.	H. W. Geddes	Birmingham, Ala.
Erie & Pittsburgh	D. L. Layne	Winona, Pa.	B. Dunn	Louisville, Ky.
Europe & North American	D. K. Mullins	Pittsfield, Pa.	Wm. Mahl	New Albany, Ind.
Evansville & Terra Haute	F. W. Crum	Bangor, Maine	Wm. B. Rice	Evansville, Ind.
Evansville, Terra Haute & Chi.	J. E. Martin	Jno. L. White	Wm. M. Lewis	Albany & St. Louis
Fitchburg	S. D. Macfarland	Evanson, Ill.	John L. Moore	Macomb, Ill.
Flemington & Mass. Div.	J. T. Turner	Benton Harbor, Ind.	John L. Moore	Portland, Me.
Fulton & Pere Marquette	F. G. Coon	Boston, Mass.	Charles E. Paige	Nashua, N. H.
Fulton & Lake Erie	M. Davidson	Baltimore, Md.	John C. Quinn	Concord, N. H.
Fonda, Johnstown & Gloversville	Samuel Spencer	Baltimore, Md.	H. C. Chamberlin	Concord, N. H.
Fox Lake, Amboy & Peoria	A. Kingdon	Memphis, Tenn.	*E. F. Winslow	New York, N. Y.
Fox Lake, Amboy & Peoria	J. C. McCormick	Memphis, Tenn.	M. K. King	New York, N. Y.
Fort Wayne, Jackson & Saginaw	M. D. Woodward	Memphis, Tenn.	Robert Stewart	Cincinnati, O.
Fort Wayne, Munice & Cincinnati	H. A. Raymond	Memphis, Tenn.	Jas. H. Stewart	Port Huron, Mich.
Fort Wayne, Munice & Cincinnati	W. W. Worthington & P. A. Gil	Memphis, Tenn.	Harry R. Hoover	Jackson, Mich.
Frankfort & Kokomo	F. B. Comstock	Frankfort, Ind.	Samuel Schoch	Middlebury, Ind.
Frederickton	F. B. Edescombe	Frederickton, N. B.	S. V. Golden	Port Huron, Mich.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Rudolph Fink	Memphis, Tenn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John A. Grant	Montgomery, Tenn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John M. Morrison	Huntville, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	M. S. Badine	Paducah, Ky.
Frederickton	F. B. Edescombe	Frederickton, N. B.	H. B. Leyard	St. Paul, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John B. Brown	Detroit, Mich.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. C. Vanaman	Jackson, Mich.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. B. Bush	Middlebury, Ind.
Frederickton	F. B. Edescombe	Frederickton, N. B.	P. S. Denforth	Thomaston, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Thomas H. Thompson	Port Hope, Ont.
Frederickton	F. B. Edescombe	Frederickton, N. B.	H. G. Taylor	Milwaukee, Wis.
Frederickton	F. B. Edescombe	Frederickton, N. B.	H. H. Reed	Minneapolis, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	G. W. Cobb	Hancock, Mich.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. E. Hatchell	Minneapolis, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Chas. F. Hatchell	Minneapolis, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Oliver Garrison	Watsonia, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Miller Bullard	Memphis, Tenn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	P. G. Fagan	Sedalia, Mo.
Frederickton	F. B. Edescombe	Frederickton, N. B.	B. C. Frost	Sedalia, Mo.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. A. Lives	St. Louis, Mo.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. S. Hosford	St. Louis, Mo.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. L. Clark	Columbus, Ga.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Edmund L. Tyler	Montgomery, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Daniel Tyler	Montgomery, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. G. Raoul	Macon, Ga.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. A. Stowell	Montgomery, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. B. Bishop	Montgomery, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Geo. Pandey	C. A. Whitney & Co., New Orleans, La.
Frederickton	F. B. Edescombe	Frederickton, N. B.	H. Mehring	Hughesville, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. E. Chamberlin	Concord, N. H.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Chas. E. Paige	Nashua, N. H.
Frederickton	F. B. Edescombe	Frederickton, N. B.	M. M. Shepard	St. Louis, Mo.
Frederickton	F. B. Edescombe	Frederickton, N. B.	H. W. Gardner	Natchez, Miss.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. H. Fitzpatrick	Waukegan, Ill.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Geo. W. Beach	Omaha, Neb.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Wm. Irving	Dutchess, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. L. Kimball	Jersey City, N. J.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Thos. H. DuPuy	Jersey City, N. J.
Frederickton	F. B. Edescombe	Frederickton, N. B.	D. B. Robinson	Selma, Ala.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John J. Howell	New Orleans, La.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. S. Bowen	New Castle, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Z. O. Chanute	New Castle, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Bright	New Haven, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. O. Bill	Port Jervis, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Benj. Thomas	Port Jervis, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	B. R. Taylor	Buffalo, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. S. Begey	Dunkirk, N. Y.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Russell	W. H. Moore
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. C. Moore	New Haven, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. W. Douglas	New Haven, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. N. Dowd	New Haven, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John J. Howell	Hartford, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. A. Hardenbergh	New Haven, Conn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. S. Bowen	St. Paul, Minn.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Z. O. Chanute	Philadelphia, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Bright	Baltimore, Md.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. O. Bill	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Benj. Thomas	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	B. R. Taylor	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. S. Begey	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Russell	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. C. Moore	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. W. Douglas	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. N. Dowd	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John J. Howell	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. A. Hardenbergh	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. S. Bowen	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Z. O. Chanute	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Bright	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. O. Bill	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Benj. Thomas	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	B. R. Taylor	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. S. Begey	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Russell	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. C. Moore	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	C. W. Douglas	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	R. N. Dowd	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	John J. Howell	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. A. Hardenbergh	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. S. Bowen	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Z. O. Chanute	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Bright	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	E. O. Bill	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	Benj. Thomas	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	B. R. Taylor	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	J. S. Begey	Williamsport, Pa.
Frederickton	F. B. Edescombe	Frederickton, N. B.	W. H. Russell	Williamsport, Pa.
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CAR AND WHEEL WORKS,  
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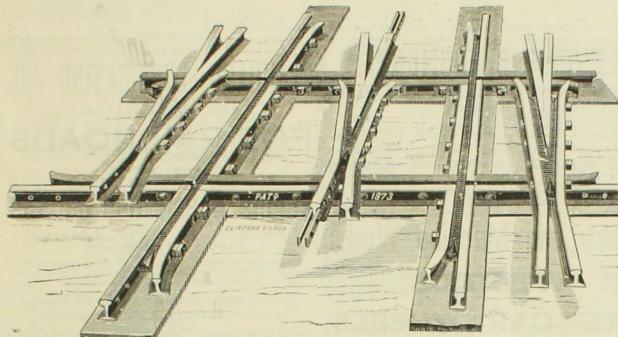
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Insoluble Siliceous Residue,	21.90	3.39
Lime,	5.71	.00
Magnesia,	2.95	.00
Carbonic Acid, Sulphur, Phosphorus, &c.,	3.64	.05
	100.00	100.00
Metallic Iron,	46.66 per cent.	67.59 per cent.

Very Truly Yours

(Signed)

*Dw. W. Morley.*

Send for samples before buying any other.

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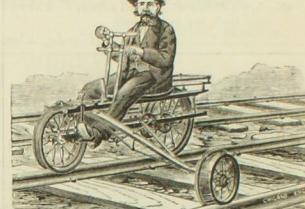
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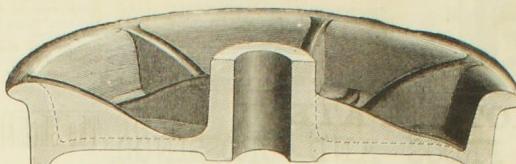
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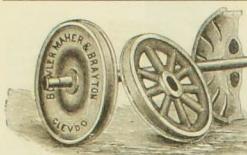
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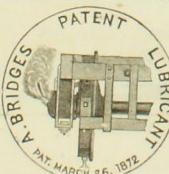
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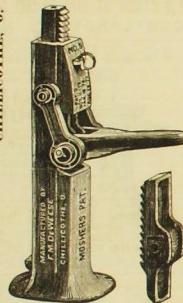
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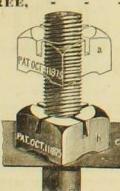
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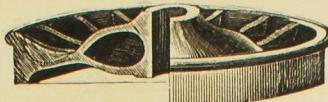
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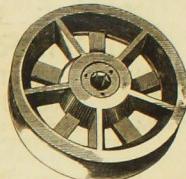
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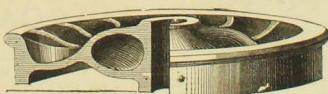
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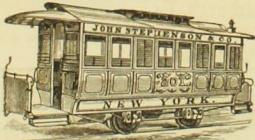
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